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Dental Digest

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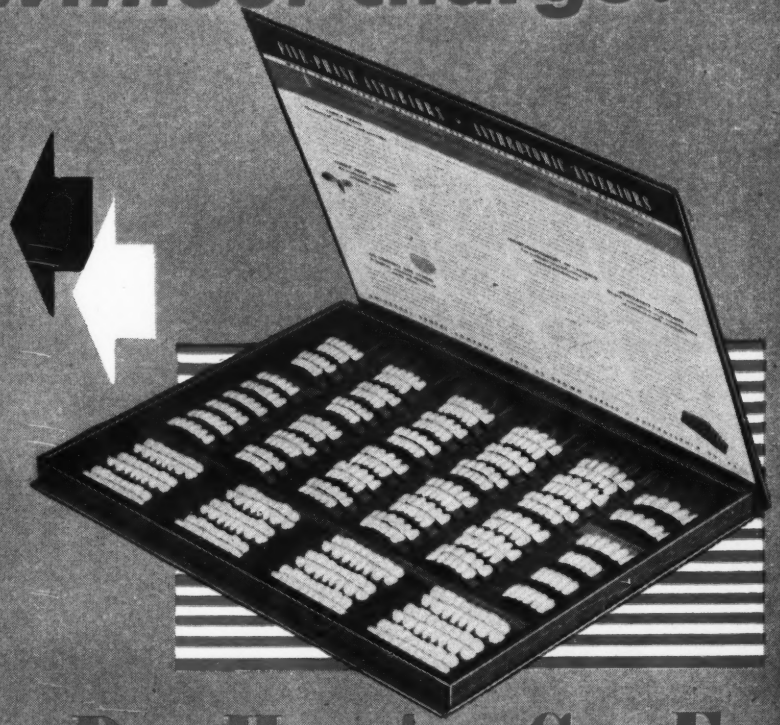

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About Our CONTRIBUTORS

Following his distinguished tour of duty in the Army Dental Corps at Walter Reed Hospital, ROBERT M. APPLEMAN, D.D.S. (Ohio State University, 1927) became an Associate Professor of Prosthetic Dentistry at the Zoller Memorial Dental Clinic of the University of Chicago. In March, 1948, Doctor Appleman published in *Oral Surgery, Oral Medicine, and Oral Pathology* under the title "Rehabilitation of Progressive Hemiatrophy of the Forehead."

ARTHUR H. SCHMIDT, D.D.S., (University of Nebraska, 1920) has been teaching prosthetics at the University of Nebraska since he graduated from that university. Doctor Schmidt's article in the current issue, PLANNING AND DESIGNING PARTIAL DENTURES, is the second installment of a series of four.

STEWART EVERSON, B.A., (Occidental College, 1939); D.D.S., (University of Maryland Dental School, 1942) is an oral surgeon who cooperates closely with prosthodontists. Doctor Everson's last appearance in DENTAL DIGEST was in February of this year. His present article, POSTEXTRACTION ALVEOLECTOMY AND ALVEOLECTOMY FOR IMMEDIATE DENTURES, describes in detail the method he has employed most successfully where an alveolectomy is indicated.

MELVIN LIONEL MOSS, A.B., (New York University, 1942); D.D.S., (Columbia University, 1946) and his collaborator, Doctor James W. Thomason, have recently returned to personal practice of general dentistry after a period of time spent in military service. The case reported, RESTORATION OF FACIAL CONTOUR WITH PLUMPERS, is particularly interesting because of the definite improvement in the patient's social adjustment, as well as in his comfort, that followed the treatment Doctor Moss has outlined.

EDWARD J. RYAN, B.S., D.D.S., Editor
708 Church Street, Evanston, Illinois

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Why PARTIAL DENTURES *Fail*

ROBERT M. APPLEMAN, D.D.S., Chicago*

DIGEST

Partial dentures are prosthetic failures if their function causes injury to natural teeth or investing tissues less than ten years after they have been placed. Preventing failures is a problem, among others, of distributing the masticatory load on the rigid and yielding tissues so that neither will be overloaded. Knowledge is required of: (1) the amount and direction of normal stresses; (2) the sources of anchorage (or support) available for withstanding stresses.

A study of the shape of the roots of the teeth indicates that these structures are designed according to the support they require against masticatory stress. A tooth subjected to strong stress in a mesial direction, for instance, has a large distal area for attachment of the root to the periodontal membrane.

An understanding of the normal forces exerted by the masticatory mechanism on individual teeth makes it clear why denture clasps and other devices must themselves exert only forces which harmonize with those already present. Surveyor principles applied to the positioning of clasp arms effect proper distribution of prosthetic stresses and thereby prevent serious damage to the periodontal tissues.

Disregarding scientific methods for partial denture construction exposes fibers of the periodontal membrane to the danger of stimulation which is abnormal in either amount or direction; resorption of the bone surrounding the teeth and loosening of the teeth themselves follow. Considering the real objective toward which he is striving, the dentist will not question the necessity of taking every step of the procedure outlined and discussed for the construction of successful partial dentures.

Scientific research in partial denture prosthesis has been limited. Some dentists writing on this phase of prosthodontics have regarded their opinions as sufficiently correct to warrant the conclusions they have presented. They little realize that their views are valid only in proportion to the number of cases in which other dentists can apply them successfully.

The measure of success of a partial denture is its capacity to function over a period of ten or more years without damaging natural teeth or investing tissues. It must be clear that the ability to achieve such a prosthesis consistently is based on scientific methods which have proved practical from a technical standpoint.

A Major Problem

One of the main difficulties in partial denture construction is that of designing an efficient appliance which will, by its presence and continual use, cause no injury to the remaining teeth or their investing tissues.

1. Partial dentures are in contact with two tissues—one yielding, the other rigid—and one of the chief problems is how the load or force of mastication is to be distributed between the two so that neither will be overloaded.

2. In addition, any dental prosthesis which makes contact with natural teeth requires a degree of precision and accuracy of fit much greater than that necessary for full dentures.

This prosthetic problem is further complicated in many instances by economic factors, under the pressure of which prescription of ideal or really sound treatment must often give way to compromise.

Analysis of Stresses

Because mucous membrane is compressible and resilient, a partial denture will tend to move slightly during mastication relative to the fixed abutment teeth. If these are rigidly clasped, they will be subjected to tipping stresses. The inevitable result of such leverage is a gradual resorption of the surrounding bone and a loosening of the teeth. Why?

Teeth Likened to Tools—Teeth may be likened to tools, the crowns being the working parts and the roots the handles by which they are held and through which they receive their support. The handle of any tool has that form and size which permits most efficient use and the best resistance to forces produced by han-

*Associate Professor, University of Chicago.

dling the tool. In dentistry, the problem would seem to be (1) to determine the amount and direction of normal stresses and then (2) to analyze the sources of the anchorage or support available for withstanding those stresses.

Periodontal Membrane No Cushion—A study of the literature reveals that the periodontal membrane functions as suspensory tissue, rather than as a cushion. The tooth is literally hung in this network of suspensory strands which serve as guy wires tensed by function of the teeth. If, then, abnormal function or stresses are applied to teeth, the normal function of the periodontal membrane is disturbed. Some fibers are overstimulated and others understimulated. Where stimulation occurs which is abnormal, in amount or direction, changes in the investing tissue take place which result in soreness of the involved teeth.

Anchorage of Teeth in Arch

Attention to the design of the teeth themselves is a factor contributing to the maintenance of their position. Human teeth can be divided into three groups according to their function as well as their position in the dental arch—the anterior segment, and the right and left buccal segments. The teeth of the anterior segment are used for shearing. However, they do not function as true shears but more as chisels because their incisal edges remain parallel. The buccal segments, through the marginal ridges, have shearing properties while the grooves and cusps are capable of crushing.

Anterior Segment—1. Upper central incisors. The axes of these teeth incline mesially and labially. The stress of function on them is in a mesial and labial direction. Their roots are pyramidal in shape and have the greatest areas for attachment to the periodontal membrane on the mesial, distal, and lingual surfaces.

2. Upper lateral incisors. The crowns of these teeth are normally about two-thirds as large as those of the centrals. And their axial inclinations are similar to those of the central incisors. Stress on the laterals is in a labial and mesial direction. There is a lessening of the labial stress because of the position of these teeth and their smaller size; but occlusion of the mandibular cuspids on the distolingual surface of the maxillary laterals increases the mesial force to which the laterals are subjected. The root form reflects this additional stress, presenting a greater surface area for mesial and distal attachment than for buccal and lingual attachment.

3. Mandibular incisors. The axes of these teeth have a labial inclination but stand almost upright mesiodistally. The stress is in a lingual and distal direction. The lingual stress is largely resisted by the arch form and contact points. The roots are markedly flattened mesiodistally, having an area for periodontal membrane attachment about double that of the area on labial and lingual surfaces.

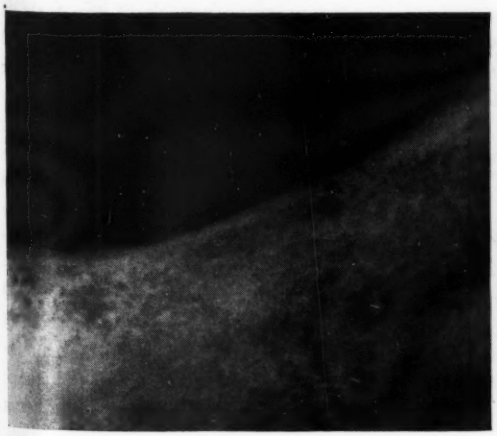
4. Cuspids. These teeth may be considered as connecting links between the anterior and posterior segments. The axial inclination in the maxilla is mesial and labial; in the mandible it is more nearly perpendicular, being only slightly lingual and mesial. The greatest stress on the cuspids in both arches is in a mesial direction. The mesial and distal surfaces of the roots are therefore largest in order to supply areas for anchorage against these stresses.

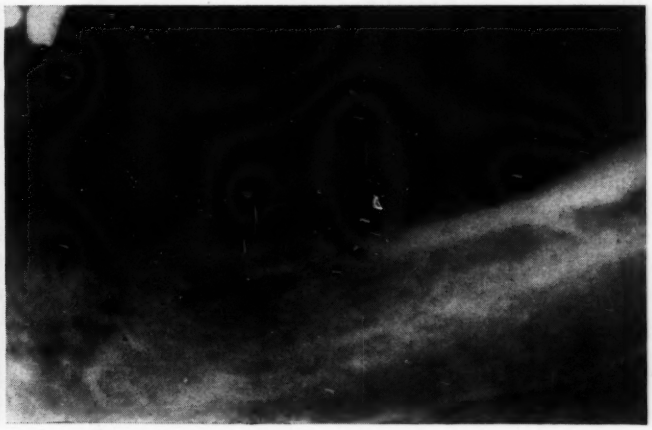
Buccal Segment—1. Maxilla. The axes of the teeth in the maxillary buccal segment incline mesially and buccally. This axial inclination, together with the curve of Spee and the direction of the stroke of the mandible, produces stresses in a mesiobuccal direction. The greatest area for attachment of these teeth to the periodontal membrane is on the distal and lingual surfaces of the roots.

2. Mandible. The mandibular buccal segment is the moving portion of this crushing, shearing unit. The teeth in this segment incline lingually and mesially. This inclination results in stress being exerted in a lingual and mesial direction. The roots of the teeth in this unit are markedly flat-

1. ***Dense cancellous bone—close-meshed type—able to withstand compression and shearing forces with minimum disintegration.***

2. ***Rarefied type of bone—large trabecular pattern—easily disintegrated.***





3. ***Swollen gingivae due to calcareous deposits in gingival area.***

4. ***Mouth after thorough prophylaxis.***

tened mesiodistally and present more than twice as much surface area for support on their mesial and distal surfaces as on their buccal and lingual surfaces.

Appliances and Adverse Forces

Clasps—With a knowledge of the anchorage of the various teeth in the arch, it becomes relatively simple to understand that clasps and other devices producing forces on certain teeth must be designed so that they do not disturb the forces already present.

Saddles—The tendency of the saddles to sink from their original position causes such a disturbance. The saddles simply settle or bed themselves into the mucous membrane; or, there is gradual resorption of the alveolar process over a long period of time from physiologic, pathologic, or traumatic causes.

Rests and Retainers—Minor causes of torque on abutment teeth are the uses of rests or indirect retainers placed upon inclined surfaces and spring pressure from badly designed or improperly adjusted clasps. Because the effect of this kind of pressure is to move the abutment teeth from their original positions, partial dentures responsible for the pressure have often been referred to as "misplaced orthodontic appliances."

How, then, are these pitfalls to be avoided in constructing appliances so that they will be a source of satisfaction, both to the patient and to the dentist? It is virtually impossible to predetermine the efficiency of a removable partial denture if the dentist has had nothing more to do with it than to take an impression and bite for the case. The failure of some partial dentures may be caused by this situation, for far too many impressions are sent to dental laboratories with the expectation that the dental technician will perform miracles.

(In behalf of the dental technician, it must be stated that his responsibility begins and ends with a denture fitting a master cast, made from an impression taken by a dentist, and articulated according to an occlusal registration furnished by the dentist. This limited responsibility does not mean that the dental technician should be unconcerned with the interest of a dental health service to the public; but rather that there should be a closer cooperation and understanding between the dentist and the dental technician.)

Procedure for Success

To avoid unsatisfactory partial dentures, it is necessary to have a definite outline of procedure in every case. This should consist of: (1) a general and roentgenologic examination of the mouth; (2) a thorough prophylaxis with any necessary periodontal treatment, and the removal of all questionable teeth; (3) the treatment of all carious lesions, particular attention being paid to normal functioning of interproximal contacts; (4) obtaining preliminary impressions, making accurate study casts, and articulating them on an anatomic articulator; (5) drawing a tentative design on the study of casts by marking the teeth that should be ground to allow for occlusal rests and to correct traumatogenic occlusion; (6) obtaining accurate impressions after all the previous steps have been completed.

Preliminary Examination—Success or failure in prosthodontics largely depends on the thoroughness of the preliminary examination of the mouth. No treatment of even a simple nature should be commenced before the operator has all of the facts of the case, has made a diagnosis, and has decided on a certain procedure with a definite result in view. Inasmuch as no two patients are ever exactly alike, it is necessary to determine by examination just what the individual peculiarities of each case are. To do this, the dentist must have a thorough knowledge of the remaining teeth and roots and of the general health of the mouth; the location of and differences in muscle attachments; the character of the tissue covering the saddle area (whether it

5. ***Insufficient lingual extension making it impossible to place a lingual bar.***

is thin and firm or thick and spongy); the relation of the upper and lower ridges to one another; and any other factors which might influence the results or procedure, such as the patient's age, general physical condition, and mental attitude.

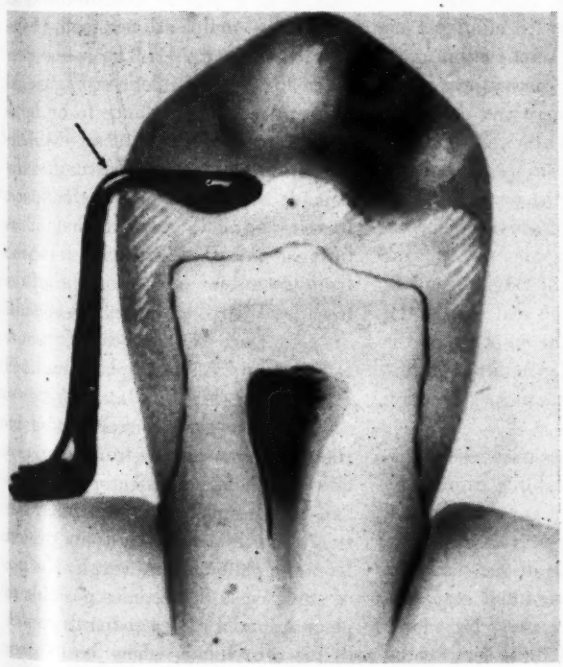
It is easy during the preliminary examination to determine the patient's general interest in keeping his mouth in good condition. This interest will be a major factor in the success or failure of the appliance over a period of years. Through the medium of the roentgenogram, the condition of the remaining teeth may more clearly be understood and the character of the underlying bone known. If dense cancellous bone is observed (Fig. 1), the possibility of obtaining satisfactory and lasting results is far greater than if the picture presents loose large trabecular patterns with questionable areas upon which to build denture bases (Fig. 2).

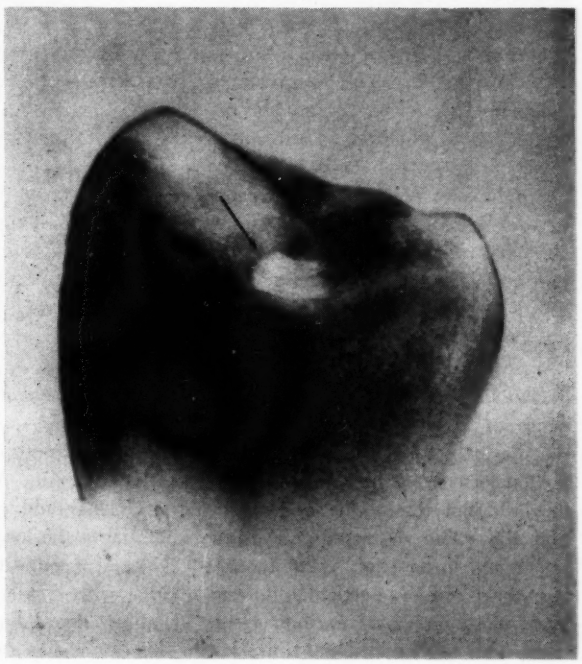
Treatment of Carious Lesions—It seems needless to say that all carious lesions should be treated; yet many times casts have been submitted for the construction of partial dentures when it was obvious that a considerable amount of operative dentistry was required. Restorations cannot be accomplished *after* the construction of partial dentures without in some way disturbing the function of the appliance. It is therefore of great importance that the mouth be put in the best possible condition *before* working casts are made. Failure to do

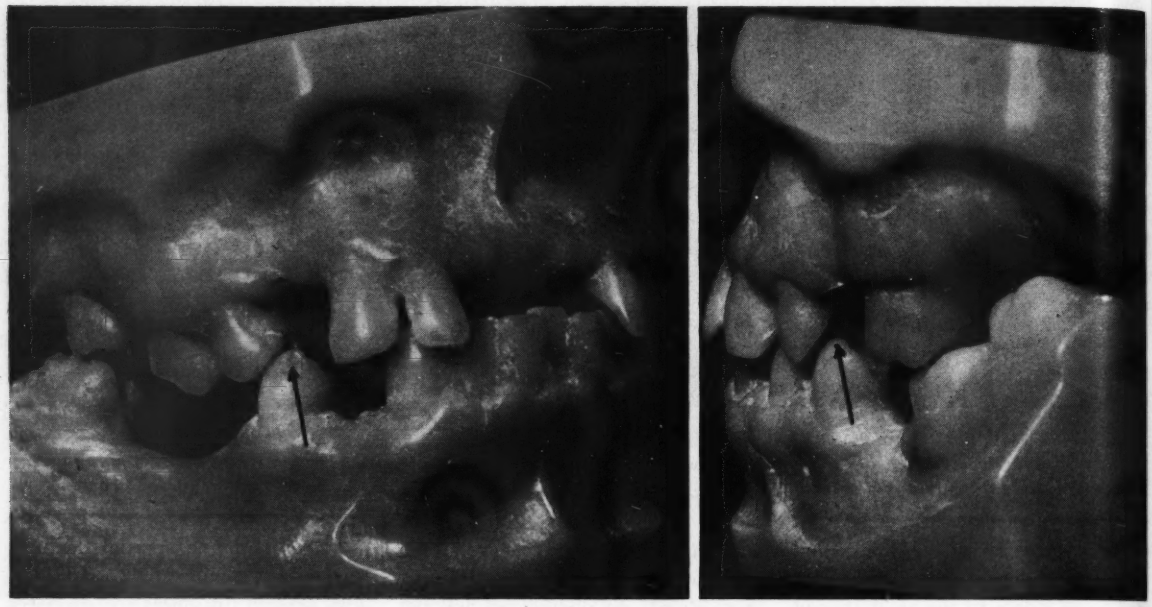
6. ***Elongation of teeth creating an impossible situation in replacement.***

7. ***Occlusal rest constructed over unprepared marginal ridge. Note thinning out of material at point of arrow.***

8. ***Correct preparation for occlusal rest. A small mounted stone was used.***







9. *and* **10.** *Arrows indicate improper preparation often observed in teeth to receive occlusal rests.*

so may be another factor in the failure of partial dentures.

Prophylaxis— With the advent of new impression materials, greater accuracy of minute details, even to the extreme undercuts, has become possible. Oral tissues under which calcareous deposits are present usually become swollen. An impression that is taken of swollen tissues does not represent normal gingivae. In many instances mouths which appear as in Figure 3 will appear as in Figure 4 after prophylaxis has been carried out. The lack of proper adaptation, which occurs when the impression is taken before a prophylaxis, is avoided if prophylaxis is rendered at the proper time in the outline of procedure. A great many practitioners feel it best to do the prophylaxis just before dismissing the patient, for it impresses the patient and greatly adds to his comfort. But so doing is an error.

Study Casts—During the war, because of heavy schedules, probably the majority of dentists omitted the next step in the outline of procedure; they did not realize the importance and the value of making accurate upper and lower study casts, mounting them on an articulator, and studying them in advance of treatment. This takes additional time; but had this procedure been carried out, cases such as Figures 5 and 6 would never have found their way into a dental laboratory, causing embarrassment to the dentist and to the laboratory technician as well. By means of this important study, it becomes possible to predetermine exactly where alterations must be made to construct an efficient, esthetic appliance.

Occlusal Rests: How often has it become necessary to eliminate an occlusal rest after completion of a case because there was not room for it? In most instances, where occlusion is not a factor, little thought and less preparation is given to teeth receiving occlusal rests, with the result that in a short time breakage occurs. Why?

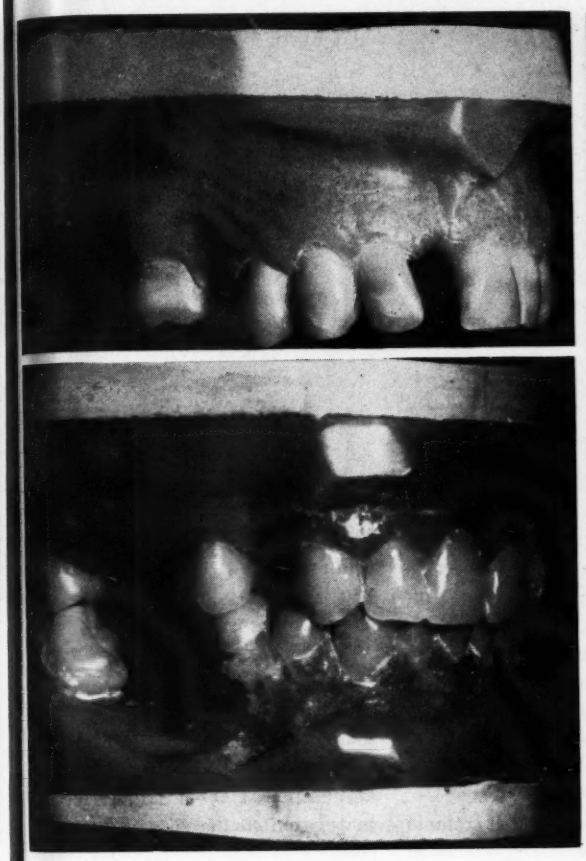
1. Occlusal rests constructed over unprepared marginal ridges result in a thinning-out of the material at the crest of the ridge, the point where the greatest strength is required if the rest is to perform its proper function (Fig. 7).

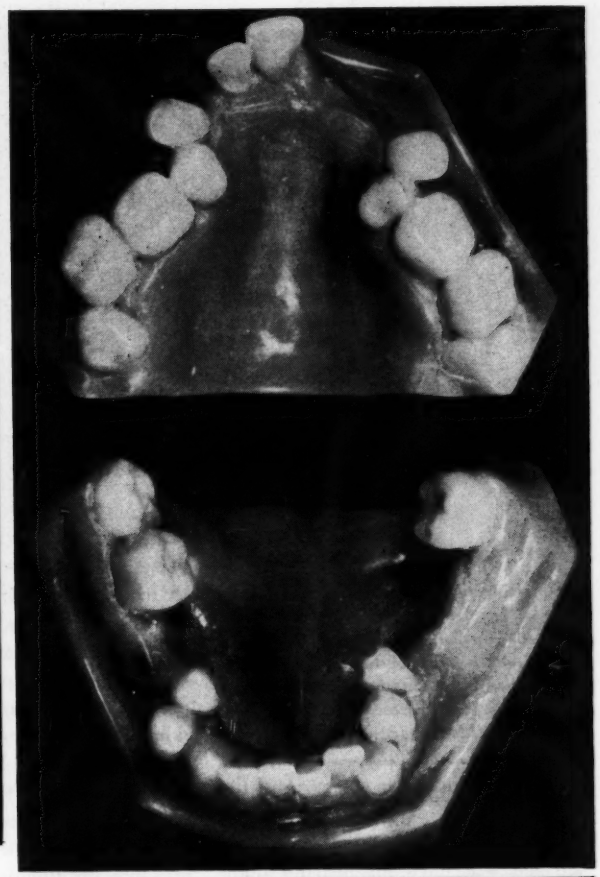
2. In planning occlusal rest preparations, the line of force exerted by the rest should always be directed parallel to the long axis of the tooth. By careful grinding of the marginal ridge with small mounted stones, a shallow depression may be made. This establishes a definite seat for the occlusal rest, giving it a uniform thickness and directing the line of force exerted (Fig. 8).

The difficulties encountered by most good laboratories result from lack of preparation of the mouth or improper preparation before impression-taking (Figs. 9 and 10).

Malpositioned Teeth: Study casts show another condition so often overlooked in a cursory examination of the mouth—malpositioned teeth (Figs. 11, 12, 13, and 14). The space provided for a replacement in Figure 11 may appear at first glance to be large enough to accommodate an esthetic-appearing tooth; yet, when an attempt is made to place a tooth in the space, it soon becomes evident that if as little as one-half millimeter is removed from the mesial surface of one of the teeth and a like amount from the distal surface of the other, a more esthetic and stronger replacement will be possible (Figs. 15 and 16).

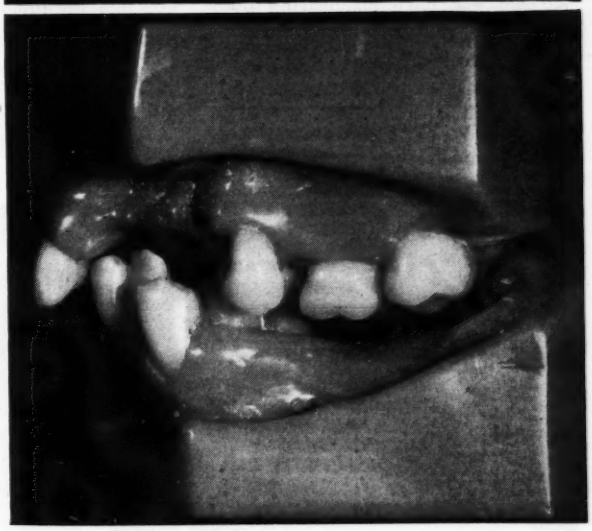
Patient Education: In some instances it is necessary to remove certain teeth before satisfactory dentures can be constructed. Many times this suggestion is met by vigorous protest from the patient; however, by the use of study casts, it becomes possible to place a model of the patient's mouth in his own hands where he can see





11. ***Top: Malposition of lateral incisor causing closure of space. Replacement of an esthetic-appearing tooth impossible under these conditions.***

12. ***Malpositioned lower third molar illustrating need of removal before satisfactory appliance can be constructed.***



13. ***Top: and*** **14.** ***Malpositioned teeth which make construction of satisfactory replacements impossible. Note complete absence of restorations and carious lesions.***

the necessity for carrying out the plan of suggested treatment.

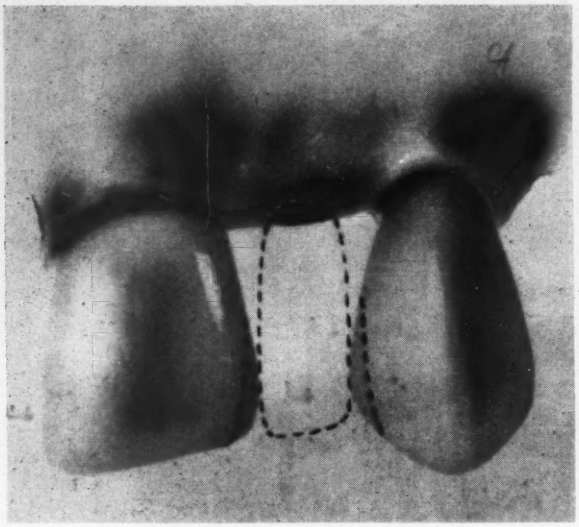
Use of Surveyor

Most partial dentures not constructed according to the surveyor principles produce results which bring about an endurance contest between the patient, his teeth, their investing tissues, and the dentist's time and efforts. The process of design has been called an engineering problem. The principles involved must be intelligently understood and employed to produce satisfactory results. To accomplish this universally, some type of surveyor, an instrument designed to show the greatest convexity of each tooth in relation to the same condition of the rest of the teeth, must be used.

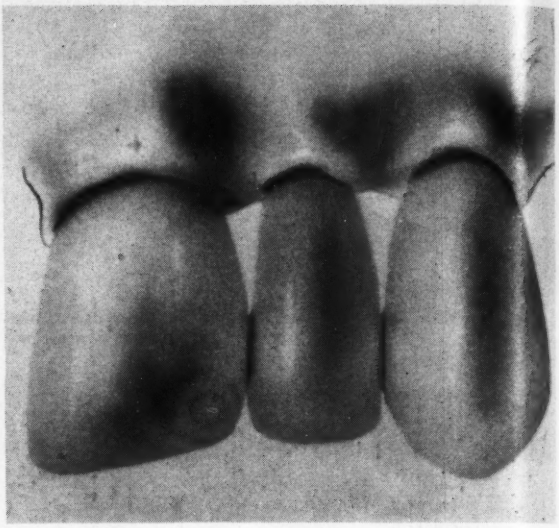
Purpose—By using such an instrument, it becomes possible to standardize a procedure in design through the use of horizontal and vertical working planes in unison. By manipulating a master cast in relation to these planes, the relationship of the surfaces of the teeth may be compared from a common vertical plane.

Advantages—The undercut surfaces which will retard placement of the denture are disclosed and may be blocked out; those which are chosen to retain the denture are left open for retentive clasp arms.

1. The line inscribed by a surveying instrument is known as a survey line. Areas gingival to it are undercut areas



15. ***Lateral incisor space partially closed by drifting of adjacent teeth. Dotted outline indicates unsightly tooth which will have to be put in unless space is widened. Dotted lines on adjoining teeth show areas to be reduced to widen space.***



16. ***Space has been widened. Note that a more nearly normal lateral incisor can now be placed in space.***

and may be used for retention of the case.

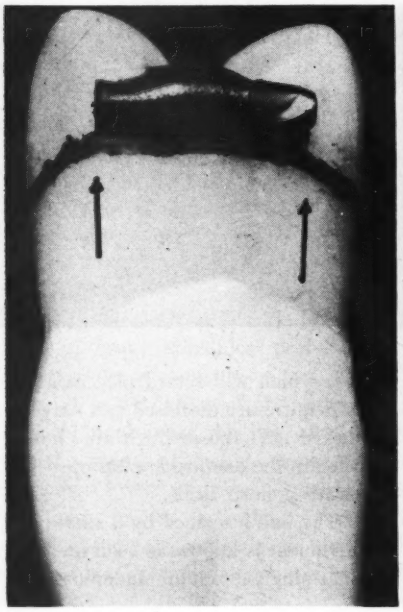
2. All other areas upon the tooth's surface will have no bearing upon retention; yet, these areas may be used for reciprocation, prevention of drifting, and bracing and support for the appliance. It is through a careful study of these areas that the location of clasp arms may be determined to prevent serious damage to the periodontal tissues.

Clasp Considerations

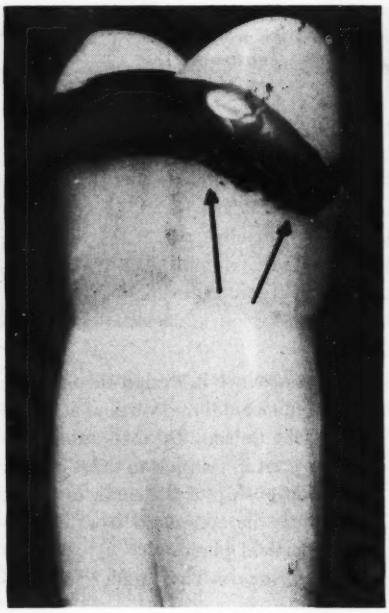
To maintain the normal functional stress on periodontal fibers, one must visualize the function of the different parts of an individual clasp.

Parts of Clasps—All types of clasps may be divided into three parts—the body, the shoulders, and the arms—and each part has a definite location in relation to the survey line if the clasp is to function properly.

1. The *body* of the clasp is the rigid part and that portion to which the



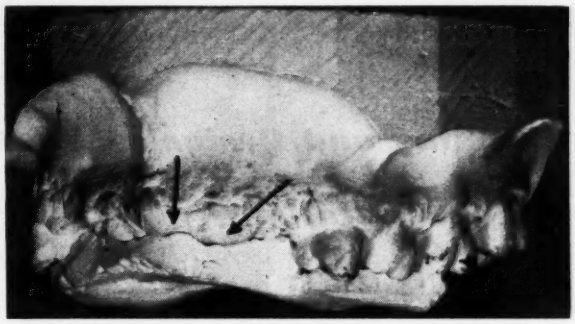
17. ***Area of tooth occupied by body of a clasp in relation to survey line.***



18. ***Correct area of tooth occupied by shoulder of a clasp in relation to survey line.***

19. ***Correct area of tooth occupied by one arm of a clasp in relation to survey line.***

20. ***Plaster matrix in position in patient's mouth. Note close apposition to the occlusal surfaces of the teeth and ridge.***



21. ***Matrix in position on cast of mouth. Note discrepancy in ridge area and also occlusal surfaces of teeth.***

occlusal rest is normally attached. Because it is rigid and nonyielding, it must always be placed in a non-undercut area vertical to the survey line. This portion of the clasp should always be in close apposition to the tooth's surface to prevent movement and produce bracing effect of the appliance (Fig. 17). If this area of the clasp is ground to permit the denture to seat, all of the bracing is destroyed. (However, if the location of this portion of the clasp is planned in advance so that its relationship is established to all other teeth being clasped, no grinding is necessary.)

2. The *shoulders* of a clasp are semirigid and are the connectors between the rigid body and the flexible arms. Because they are semirigid they should always be placed so that they are on the survey line or just crossing it (Fig. 18).

3.The *arms* of the clasp are the flexible free ends, and at least one of them must be placed entirely below the survey line in an undercut area (Fig. 19). Inasmuch as a great amount of pressure may be exerted by this part of the clasp, it is necessary to have the opposing arm of the clasp in a reciprocal position upon the tooth's surface.

Through careful planning and the placing of each part of a clasp in its proper position, the amount of stress placed on a tooth may be compensated for. Soreness and destruction to the periodontal membrane are thus avoided.

Path of Insertion—Some men have said, "Surely, that's fine. But I can find the greatest convexity of a tooth *without* using an instrument." To be sure that is true. But the positioning of a clasp on a denture is relative to that of all others; all clasps must seat together and have a definite relationship to each other. If all clasps are designed to seat in a direction which is parallel to the vertical arm of the surveyor, a common path of insertion is automatically established.

The seating direction should be planned and drawn upon the study models before working casts are obtained. Most good laboratories survey the casts before they attempt to construct cases, but few of them ever tell the dentist the path of insertion of the appliance. It is imperative that this procedure be reversed and that the dentist either write a prescription for the case desired or talk with the technician about it, if successful partial dentures are to be constructed. This can only be accomplished when more dentists obtain study casts, draw designs of proposed cases on them, and then demand that technicians follow these designs.

Final Impression

The type of material used in taking the final impression, after all of the previous steps have been accomplished, makes little difference. It is important that the cast produced be an exact duplicate of conditions which exist in the mouth. In order to be certain that this is true, I have found it completely satisfactory to construct a plaster matrix in the mouth (Fig. 20), transferring it to the cast to ascertain the accuracy of the master cast (Fig. 21).

Summary

In the construction of partial dentures, there is no magic. Each step in the procedure is of equal importance and any attempt to by-pass one will only cause trouble, from the standpoint of rendering the best service possible to patients and that of conserving time. Previous failures may be converted into successful appliances which will stand the test of time when the following procedure is adhered to in every case:

1. Make a thorough general examination of the mouth, including roentgenograms.

2. Give a thorough prophylaxis and any necessary periodontal treatment. Remove all questionable teeth.

3. Treat all carious lesions, establishing the normal function of interproximal contact points.

4. Obtain preliminary impressions, making accurate study models and articulating them on an anatomic articulator.

5. Draw the design of the case to be constructed on the study models, after surveying the abutment teeth, and mark the teeth where grinding is necessary to allow for occlusal rests and to correct traumatogenic occlusion.

6. Make these necessary corrections and then obtain accurate impressions.

Walter G. Zoller Memorial Dental Clinic, University of Chicago.

Planning and Designing PARTIAL DENTURES

(*Second Installment*)

A. H. Schmidt, D.D.S., Lincoln, Nebraska

DIGEST

This second installment on the general subject of partial denture prosthesis covers:

1. The use of the surveyor.

2. The analysis of stress by the photoelastic method.

3. The use of gauges to measure the amount of horizontal undercut.

The Surveyor

The primary value of the surveyor is its use in studying and analyzing partial denture cases with a view of creating favorable clasping conditions. This is accomplished by tilting the model, and then making use of a specific group of clasps of known value and function.

The problem is how to tilt the model to satisfy various conditions and how to determine the amount of tilt for each individual case.

There are five rules that cover any condition that might be presented by missing teeth.

Photoelastic Stress Analysis of Clasps

The photoelastic method of stress analysis has been used by engineers in developing the designs of many complicated mechanisms and in determining the case of failure of a wide variety of engineering structures.

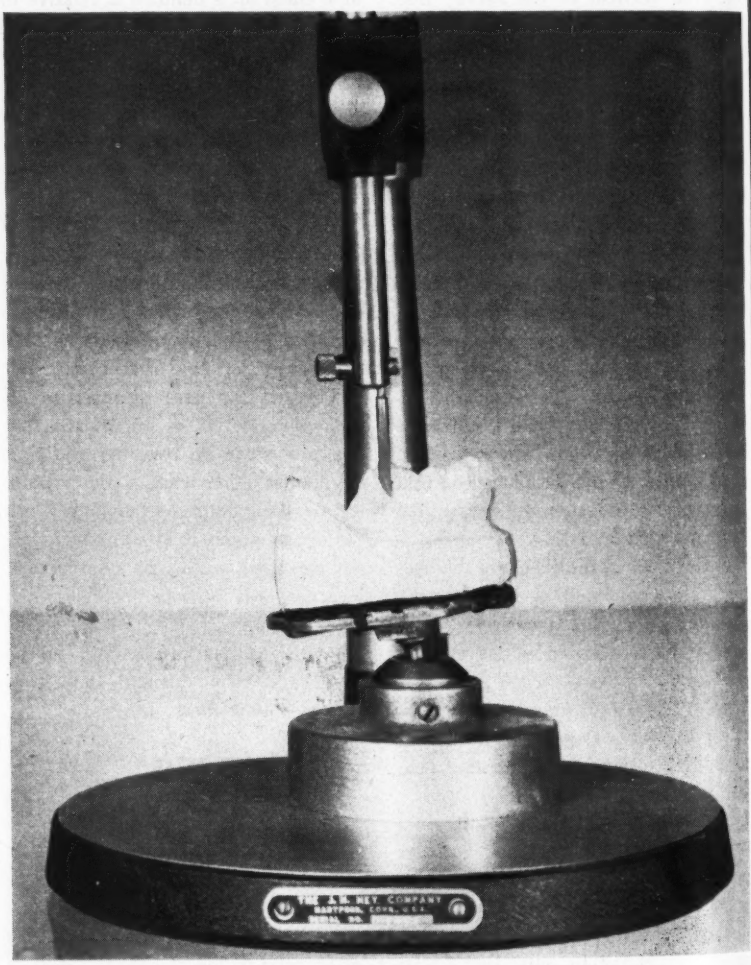
Undercut Gauges

The gauges are a means for accurately measuring the amount of horizontal undercut necessary for the various clasps, and indicate the proper position of the clasp ends regardless of the shape of the tooth; the tilt of the case; or the angle or position of the tooth in the arch.

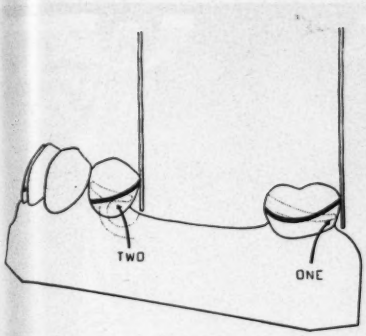
If clasps are hand-waxed and vary from the size and shapes produced from the Waxing Die, the amount of undercut engaged by the tips of the clasps should vary; engaging more undercut if the waxing is lighter and less undercut if the waxing is heavier.

The gauge head indicates where the gingival tip of the clasp should be after the casting is finished and polished.

The University of Nebraska College of Dentistry.

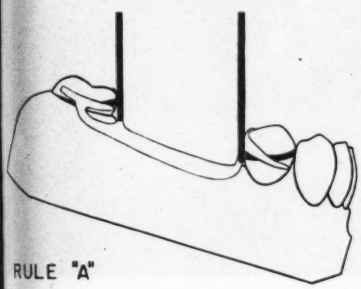


14. ***The survey table slides on the accurately machined floor of the instrument which has, bolted to it, an upright standard with a horizontal arm extending over the center of the floor. The head of this arm is drilled to take the vertical spindle which in turn holds the analyzing mandrel and the marking carbon.***

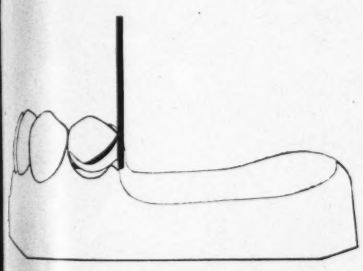


use anterior or **posterior** tilt

16. ***Rule A of the General Rules for Tilting deals with the all tooth-bearing case supplying no anteriors. Either a posterior or anterior tilt may be used, depending on the undercut condition. Posterior tilt is generally selected because it places the #1, or bracing, clasps, on the stronger molar abutment.***

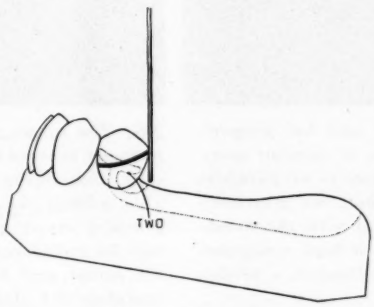


17. ***When the posterior abutment is the weaker, or stands at an angle which makes the #1 clasp impractical, the anterior tilt may be used. This creates the #1 condition on the bicuspid and #2 indication on the molar. The #2 clasp or the Ring Clasp may be used on the molar.***



18. ***A free-end saddle case designed on a horizontal plane. This is a poor #2 clasp indication on which was placed a #1 Aker-type clasp, in the hope that it would hold the saddles down on the ridge. The flexible arms do not engage an undercut and the rigid body of the clasp must be ground away to allow the case to be seated.***

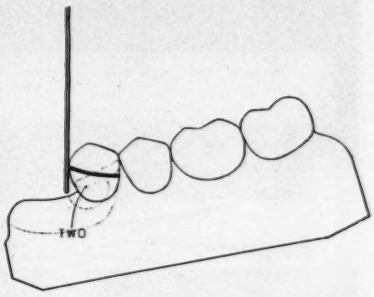
15. ***The change of tilt reverses the undercut areas on the abutment teeth, thereby creating an entirely different clasp indication on each.***



use **posterior** tilt

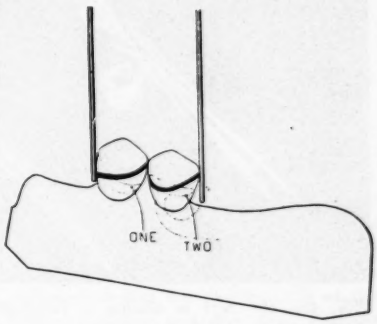
19. ***Rule B states that all posterior free-end saddle cases should be surveyed using a posterior tilt. This creates the undercut on the side of the abutment tooth next to the saddle, and by designing the #2 bar clasp to curl back in under the #2 surveyed line, retention is obtained in that undercut at the saddle.***

22. ***Rule E resembles Rule A but it applies especially to dentures where anterior teeth are to be supplied on the lingual or palatal bar. A posterior tilt should always be used because it makes it possible to seat the case without excessive interproximal spaces in the anterior region and to produce overlapping of centrals and laterals if desired.***



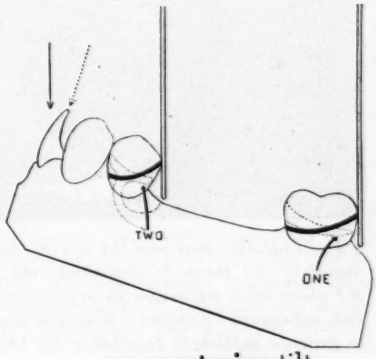
use **anterior** tilt

20. ***Rule C covers anterior free-end saddle cases and the anterior tilt should be used. This provides undercuts on the anterior side of the abutment teeth in order to hold the saddle against the ridge. It establishes a #2 surveyed line and therefore, the #1 clasp cannot be used for this case.***

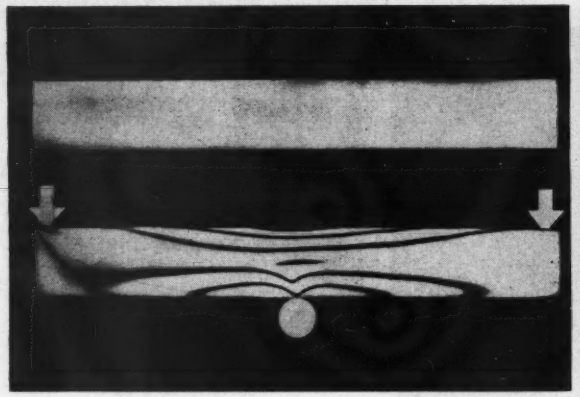


use anterior or **posterior** tilt

21. ***Rule D. The general procedure in these cases is to use a posterior tilt since sticky foods usually exert their greatest pull in the molar region. Consequently, using the posterior tilt, this double free-end saddle case has a #2 clasp on the second bicuspid and the bracing #1 clasp on the other abutment.***

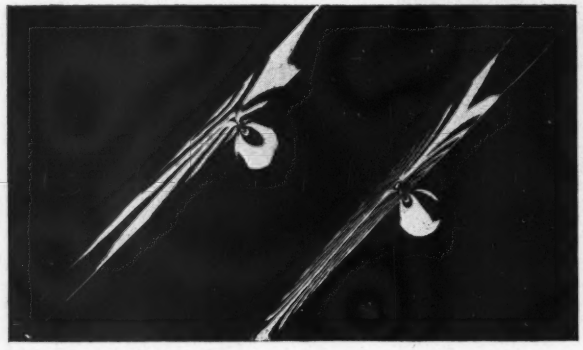


use **posterior** tilt



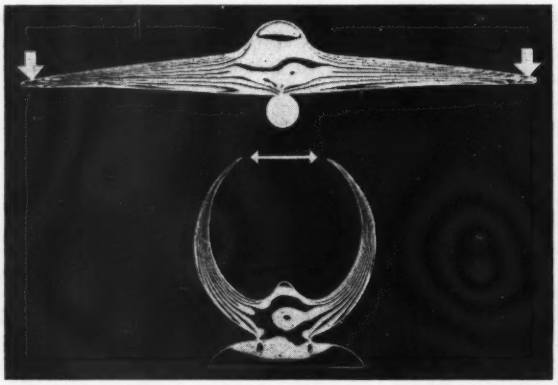
23. *Model is made of some transparent material such as glass, celluloid or clear bakelite and loaded as if in actual use to be observed or viewed with polarized light. The object or model will be uniformly gray if material is free from stress, but will show colored or black and white bands if stressed. The location and distribution of the bands indicate the location and distribution of stress developed in the model.*

24. *This picture represents the flanged wheel of a railroad car traveling on a rail. The cross section on the left shows the stress distribution in the wheel and rail for a straight track while the one on the right shows the much greater stress developed when the car goes around a curve.*

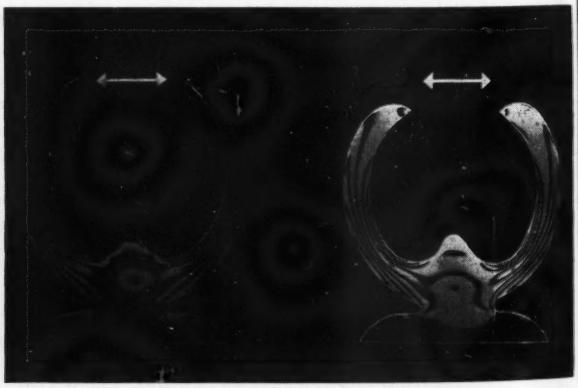


25. *On the left is shown a baseball and bat properly connected for a base hit. On the right is another story. When ball and bat connect properly there is no excessive concentration of stress anywhere in the bat, and practically no stress at all where the bat is gripped with the hands. When they connect improperly there is a high concentration of stress which may result in poor distance, a broken bat, and a pair of stinging hands.*

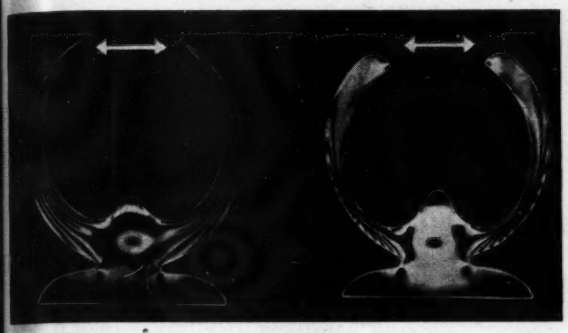
26. *The upper form in this picture is a cantilever beam properly tapered and provided with fillets to insure a more even distribution of stress throughout its entire length. This reduces the danger of breakage at the fixed end and provides much greater flexibility. The lower illustration may be considered a pair of cantilever beams, supported in the center and loaded at each end. This is similar to a complete #1 clasp rigidly fixed at the occlusal rest area.*



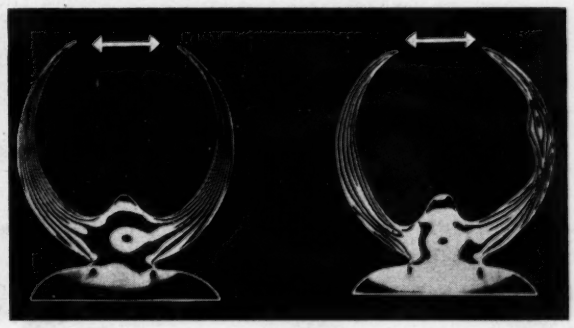
27. *Similarity between the simple tapered beam and the complete #1 clasp. It also shows the tapered form of the #1 clasp arms necessary to prevent concentration of stress and subsequent breakage near the occlusal rest area, and to provide sufficient flexibility for the tips of the arms to engage the undercut areas on the abutment tooth.*



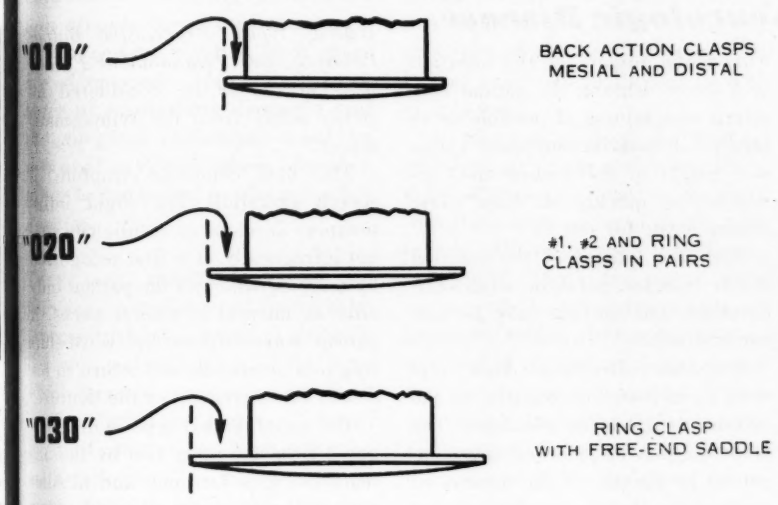
28. *Correctly tapered form of the #1 clasp is shown on the left. The incorrect form is shown on the right. The arms of the clasp on the right are not tapered toward the ends but are the same thickness throughout. This form causes excessive stress to be developed in the shoulders of the clasp and is likely to cause breakage at these points.*



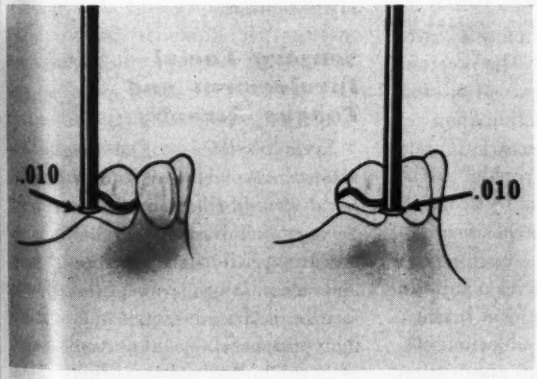
29. *Another frequent error is shown on the right. Instead of being tapered toward the free end, the arms are actually tapered in the opposite directions. As a result the shoulders are made the weakest portion and in addition practically all of the normal stresses are concentrated in these areas. Such a clasp cannot be expected to stand up in service.*



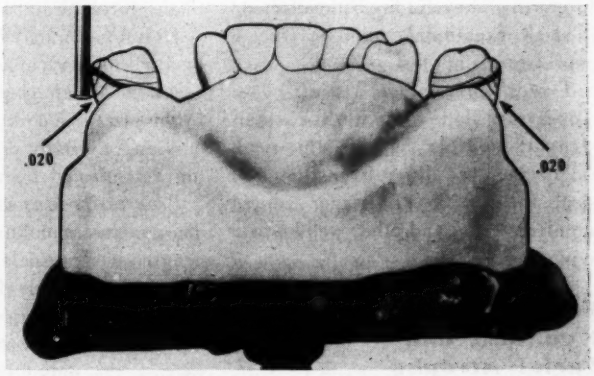
30. *A common error on the right, a clasp properly tapered but ruined during the process of finishing and polishing or by grinding while adjusting the appliance in the mouth. Such improper grinding or finishing not only produces mechanical weaknesses at the thin or nicked spots, but also increases the concentration of stress at these points.*



31. *Undercut Gauge. In designing the clasp, the rigid portion must be placed on the nonundercut area while the resilient portion of the clasp arm must engage the undercut area. It is important that the resilient tip of the clasp engages just the right amount of horizontal undercut.*

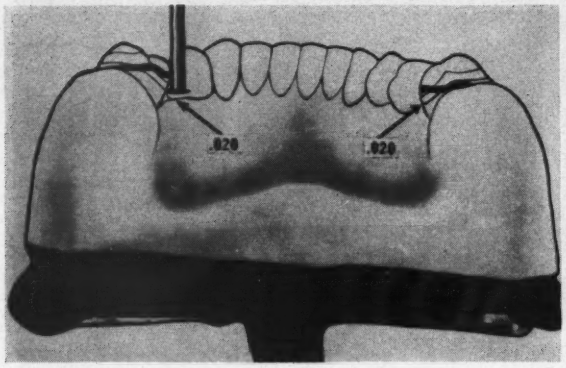


32. *Designing Back-Action Clasp with the use of the Undercut Gauge. The gauge should contact the tooth at two points, the vertical shank at the survey line and the gauge head at the distal undercut, this showing exactly where the gingival edge of the finished clasp should be.*

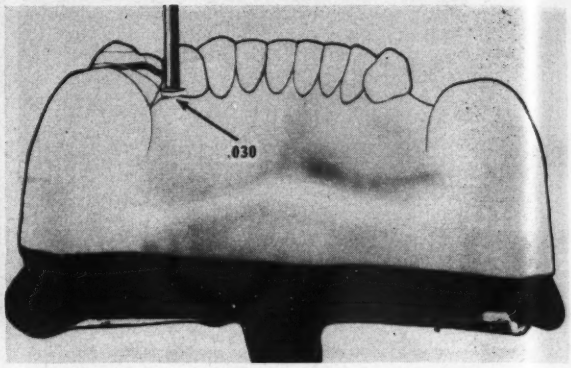


33. *Designing Ring Clasps with the use of the Undercut Gauge. When molars flare buccally away from each other, as on an upper, Ring Clasps are usually indicated and the .020 gauge is used on bilateral all-tooth supported cases. This is usually on the mesiobuccal surface of the molars. No teeth are supplied posterior to the abutment teeth.*

(*See page* 502 *for illustrations* 34-35)



34. ***Designing Ring Clasps with the use of the Undercut Gauge. When molars lean lingually toward each other, as on a lower, Ring Clasps are usually indicated and the .020 gauge is used to determine the correct amount of undercut retention on the mesiolingual surface of the molar abutments.***



35. ***Where the case is bilateral, one side having a molar abutment that leans buccally, as on uppers, or leans lingually as in this lower with a free-end saddle on the opposite side of the arch, the .030 gauge may be used to determine the maximum point of retention undercut on the molar abutment.***

Early Symptoms of Neurologic Disease

FOLLOWING ARE some of the early symptoms of diseases the dentist may have the initial opportunity to recognize, since in the more advanced stages the patient and his physician will already have become aware of the disease.

Early Facial Weakness

Multiple Sclerosis — The early facial weakness associated with this disease may be slight. On the involved side of the face, it is usually greater over the lower portion; the corner of the mouth droops, and responds weakly when effort is made to retract it; the nasolabial fold flattens and becomes smooth. The muscles of the forehead and eyelid are little affected, if at all. Emotional (mimetic) facial expression is not lost.

Typical Trigeminal Neuralgia — Appearing alone or with the other signs of multiple sclerosis, this neuralgia does not differ from the classical form with its trigger zones, agonizing pain, and other well-known symptoms.

Early Masticatory Weakness and Facial Atrophy

Myasthenia Gravis—The usual onset is gradual and progressive, though at first the fatigue is quickly relieved by rest. Then fatigue develops after less exertion, and more rest is required. Should the onset coincide with dental surgery or the insertion of a lower denture, the patient may return complaining of possible nerve injury, or that the supposed excessive weight of the denture tires his muscles so quickly he must pause during meals for rest.

With the fatigue of the external ocular muscles, paralytic strabismus develops, and the eye may become immobilized.

Myotonia Atrophica—This presents an increased contractility of the muscles with delayed relaxation. The myotonia may be preceded or accompanied by atrophy of the muscles of mastication, facial muscles, sternocleidomastoid muscles, and muscles of the forearm and leg.

Examination may disclose a scarcely discernible atrophy. The myotonic reaction, which consists of a slow, prolonged tonic contraction upon percussion, is usually present in muscles not yet affected by atrophy.

Progressive Muscular Dystrophy—The facioscapulohumeral form of progressive muscular dystrophy is similar in its early facial manifestations to myotonia atrophica. It affects the facial, arm and shoulder muscles, sparing the muscles of mastication. Weakness is the significant symptom with atrophy being superimposed.

Early Speech and Swallowing Difficulties

Amyotrophic Lateral Sclerosis (bulbar type), Progressive Bulbar Paralysis, and Pseudobulbar Paralysis—These may be considered together solely from the symptomatic aspect.

The first common symptom is speech alteration. The slight indistinctness develops so insidiously that not infrequently, it is first recognized by someone who sees the patient only after an interval of several weeks. A patient may attribute the word-slurring to a prosthesis, and return to his dentist for correction of the denture.

The pseudobulbar type is differentiated from the other two by the absence of signs (atrophy and fibrillation) of lower motor neuron lesions, and by the presence of emotional manifestations.

Sensory Facial Involvement and Tongue Atrophy

Syringobulbia — The tongue exhibits the typical lower motor neuron paralysis—fibrillation and atrophy. Sensory involvement of the face is a characteristic sign. The loss of pain and temperature perception of the face is of the concentric type rather than peripheral. Vagal nerve damage, as in the bulbar palsies, brings about swallowing difficulties, accompanied by hoarseness and palatal weakness.

Along with the loss of pain and temperature perception on the homolateral side of the face, there is also

(*Continued on page* 522)

POSTEXTRACTION ALVEOLECTOMY

and Alveolectomy for Immediate Dentures

STEWART EVERSON, D.D.S., Los Angeles

DIGEST

Conditions requiring postextraction alveolectomy and the surgical procedure used in such cases are discussed. Also the advantages of immediate dentures and the surgical technique used by the oral surgeon when alveolectomy is indicated by the prosthodontist.

THERE ARE various abnormal and pathologic conditions of the alveolar process such as congenital deformities and malformations of the bone which require complex and difficult surgical techniques. However, one of the most common causes necessitating an alveolectomy is the careless removal of teeth where the plate has been fractured or the bone left untrimmed. A certain amount of alveolar bone trimming is usually necessary following the removal of one or more teeth. If the bone and tissues are unduly traumatized at the time the teeth are extracted and if care is not taken to trim and smooth the bone edges properly many postoperative defects which require surgical interference may result. Conversely, if good surgical technique were employed, the need for postextraction alveolectomies would be considerably decreased.

Postextraction alveolectomy is most often indicated because of exotosis, bony protrusions or abnormally prominent ridges. The alveolectomy, therefore, which is done to correct these conditions, is chosen for exemplification because the oral surgeon deals with these particular conditions more than any other requiring this surgical procedure. Also, the principles of the technique to be described can be applied to any type of alveolectomy.

An edentulous patient requiring an alveolectomy of the entire maxillary ridge is chosen to illustrate the most important steps involved in the procedure. All cases are studied preoperatively. Particular attention is given to the height and formation of the bony ridges, submucous tissues, mobility of the mucoperiosteum, and the size of the tuberosities. Roentgenograms are taken to determine the position of the maxillary sinuses, the presence of retained roots, or impacted teeth.

Surgical Technique for Radical Alveolectomy

In my office the patient is given pentothal sodium intravenous anesthesia if there are no contraindications. The mucous membrane, in the field of operation, is swabbed with merthiolate.

An incision is then made through the mucoperiosteum, starting at a point just distal to the maxillary tuberosity and extending around the crest of the entire alveolar ridge to a point just distal to the tuberosity of the opposite side (Fig. 1). A sharp scalpel should be used with sufficient pressure to insure a clean cut incision completely through the mucoperiosteum to the bone.

The mucoperiosteum of the buccal side is reflected from the bone to afford adequate vision of the bony area which is to be removed. Care should be taken to elevate the periosteum with the mucous membrane without tearing the soft tissues. The retraction is started at the beginning of the incision and carried around the arch to the end of the incision on the opposite side.

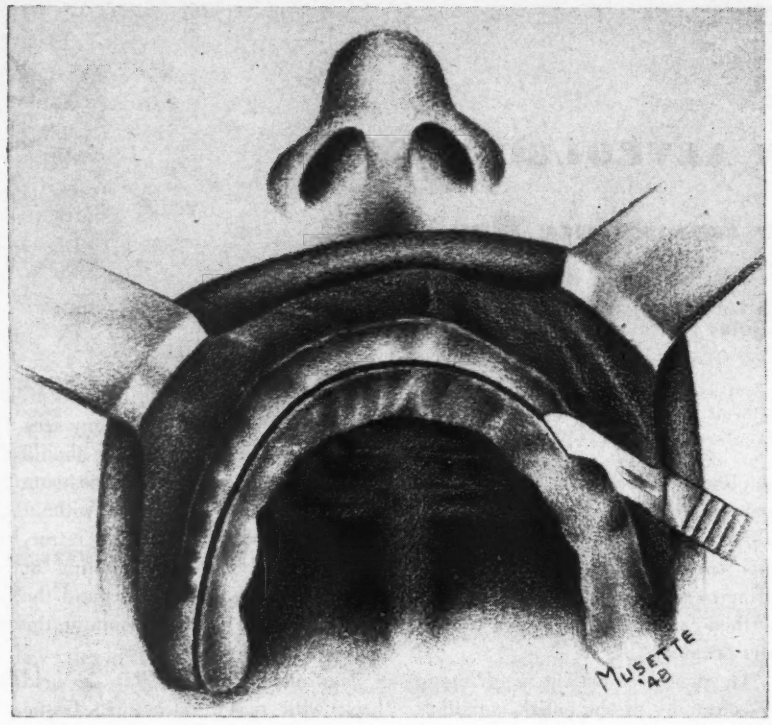
The mucoperiosteal flap is held back with tissue retractors. Tissue forceps or clamps should not be used because of the danger of traumatizing the tissues unnecessarily.

The mucoperiosteum of the palatal side of the arch is slightly loosened from the crest of the ridge unless it is necessary to reflect it further in order to reach protruding bony areas.

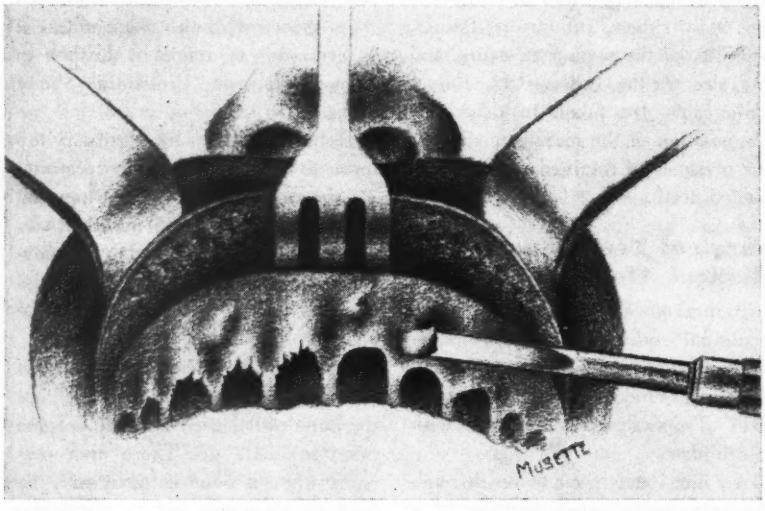
If the maxillary tuberosity is too large to accommodate the reception of the dentures, any overhanging bone is first removed. The tuberosity height may be shortened by removing a triangular portion of the fibrous tissue overlying the tuberosity, the base of which rests on the bone.

Instruments—The alveolar ridge is trimmed with sharp chisels which cut the bone rather than crush it as some bone rongeurs do. There are occasions when a bone rongeur may be used to advantage but as a rule the sharp chisel causes less trauma. Care must be taken not to remove more bone than is necessary. The irregular edges of bone may be smoothed with a bone file but this is not often necessary.

The mucoperiosteum is brought back to its original position over the bone and the ridge is tested for smoothness by digital palpation of



1. ***An incision, to the bone, is made just distal to the maxillary tuberosity, and extended around the crest of the ridge to a point just distal to the tuberosity of the opposite side.***



2. ***The mucoperiosteal flap is reflected with a tissue retractor to afford adequate vision for the removal of bony protuberances The left side of the drawing shows the irregular bone edges of the alveolar sockets in comparison to those of the right side which have been trimmed.***

the entire area. When the surgeon is satisfied that no sharp edges remain, the flap is retracted again and the entire area is thoroughly curetted to insure the complete removal of bone spicules and bone filings.

If a great deal of bone has been excised there will be an overlap of soft tissue when the incised edges are approximated. The margin of the soft tissue is trimmed with sharp surgical scissors to permit coaptation without tension. The area is sutured with black 000 silk, using interrupted, continuous running or continuous block skin sutures. Sutures are taken out on the fourth postoperative day.

Advantages of Immediate Denture

The majority of patients who are referred to me by the prosthodontist are immediate denture cases. The advantages of having a denture inserted immediately postoperatively are innumerable. Practically the only disadvantage is the additional expense for rebasing. An edentulous patient is not embarrassed by his appearance, speech, and inability to eat if he has an immediate denture. In addition to the esthetic advantages the patient experiences less postoperative pain because the denture acts as a protective splint for the tissues.

Preoperative Study—In order to determine the amount of bone and soft tissue to be removed, each immediate denture case should be studied preoperatively. Roentgenograms must be available. The oral surgeon is expected to anticipate every wish of the prosthodontist in regard to the case. It is the surgeon's purpose and responsibility to prepare the alveolar process in such a way that there will be proper adaptation and maximum comfortable retention of the dentures.

Surgery—The supporting bone and tissues of these areas are surgically prepared for dentures at the time the teeth are removed. Depending on the number of remaining teeth, surgery for immediate denture cases is usually divided into two or three sessions.

1. First I remove the posterior mandibular and maxillary teeth of one side.

2. After a period of one week, I remove the posterior teeth of the opposite side. After the posterior teeth have been removed the prosthodontist usually allows five or six weeks

to elapse before taking impressions for the immediate dentures.

3. After the impressions have been taken, the patient is ready to have the remaining anterior teeth removed.

Technique for the Surgery and the Insertion of an Immediate Denture

In my office the patient is generally given pentothal sodium intravenous anesthesia. The mucous membrane in the field of the operation is swabbed with merthiolate. An incision, approximately 1 centimeter long, is made distal to the remaining cuspids on each side. The gingival attachments are severed, either with a periosteotome or a scalpel, on the labial side and the mucoperiosteal flap is reflected from the teeth.

If preferred, an incision may be made at a point distal to the cuspid of one side and extended over the gingival margins of the anterior teeth to a point distal to the cuspid of the opposite side. If the surgeon intends to remove a portion of the labial plate, it is better to take some bone from around the necks of the teeth before extracting them. If the bone is removed with a chisel from the neck portion of the roots, on the labial side, the removal of the teeth will be facilitated and excessive trauma prevented. If it is important to save the entire labial plate, the teeth are extracted in the usual manner.

After the teeth have been removed the bone is trimmed with a chisel or rongeur forceps to conform with the stone cast or clear acrylic baseplate of the patient's mouth (Fig. 2). The bone edges are smoothed with a file and the soft tissues coapted without tension. Two or three interrupted sutures should be used to hold the mucoperiosteal flap in position.

The dentures are inserted by the oral surgeon immediately postoperatively.

Postoperative Treatment

The patient is instructed to use ice packs on the outside of the face as soon as he gets home. Eight hours postoperatively he should start using frequent hot saline mouth washes. He is warned not to remove the dentures under any circumstances.

On the second postoperative day the dentures are removed for the first time when the patient returns to the office for treatment. At this time the sutures are removed and the region is well irrigated with warm saline solution. An intraoral examination is made for inflamed areas caused by pressure of the denture which should be relieved by the prosthodontist.

The denture is then replaced and the patient is instructed to remove them only for cleansing purposes. Another examination is made on the fifth postoperative day. If there are no complications, the patient may now be dismissed.

2007 *Wilshire Boulevard*

Impregnation for Caries Prophylaxis

BERNHARD GOTTLIEB, M.D.

Technique

1. Teeth which are to be extracted, should be removed before impregnation.

2. A thorough prophylaxis should be given.

3. Isolate three or four teeth at a time with cotton rolls. (It is of utmost importance to keep the teeth surfaces meticulously dry. Remaining moisture has proved to be the most common cause of failure.)

4. Wash the teeth thoroughly with benzine which permits the fluid to penetrate better.

There is a great difference in the surface tension of different chemicals. Pour out the necessary quantity of the two chemicals which are to be used into two dappen dishes and add a drop of surface tension lowering chemical to each portion, (1 per cent solution of nacconol). A 1 per cent solution of nacconol LAL as a wetting medium is recommended.

5. Pick up the surplus of the chemical used from the gingival margin with a cotton pellet. Nacconol is preferred. If the nacconol is allowed to flow freely over the surrounding soft tissue, preparation for the use of strong chemicals has been made.

6. For impregnation a 40 per cent solution of zinc chloride in distilled water is recommended. If it is not allowed to come in contact with the mucous membrane for a prolonged time this concentration may be used without hesitation. In order to make sure that it penetrates between the contact points pass dental floss through contacts.

7. Then apply 20 per cent potassium ferro cyanide, again passing dental floss between the contacts and picking up the surplus from the gingival margins.

8. To obtain good penetration the zinc chloride should be left on the tooth one minute.

9. Where a thin wall of dentine separates the tooth surfaces from the pulp, precipitate the zinc chloride with potassium ferro cyanide in less than thirty seconds and repeat the impregnation.

In this way the zinc chloride is prevented from penetrating to the pulp and damaging it.

10. The application of the potassium ferro cyanide should be repeated every 30 seconds until a milky precipitation appears. This precipitation develops slowly.

11. The precipitated surface should then be moistened with water. This completes the precipitation (in cavities).

12. A pellet soaked with water should be placed in the cavity.

13. To be sure that some place has not been omitted, impregnate a mouth twice at intervals of a few days.

14. Check the result of the impregnation by testing its power of desensitization of dentine. This gives instant information about the action on caries prophylaxis.

Combined Use With Silver Nitrate

Some dentists report that the desensitization effect on dentine is best

(*Continued on page* 522)

Restoration of Facial Contour with PLUMPERS

Captain MELVIN L. MOSS (DC) and Captain JAMES W. THOMASON (DC) Brooklyn, N. Y.

DIGEST

This paper presents an illustration of a fairly common variation in normal full denture construction. The marked change that resulted in both facial appearance and mental attitude of the patient following the simple procedure carried out was striking.

THE PATIENT to be discussed first presented himself at our dental clinic for the extraction of two maxillary bicuspids. These were the only remaining teeth of the upper dentition. Examination revealed that the lower dentition was also incomplete; both first and second molars were missing bilaterally as well as the second bicuspids.

The patient's dental history was one of frequent extraction of teeth because of caries with pulp involvement. He had been treated at numerous army dental clinics, never staying in one station long enough to have an overall treatment accomplished.

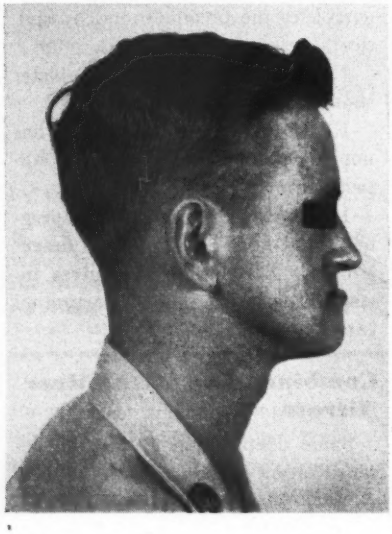
Appearance and Personality

This young man was nineteen years old. It is significant that he was obviously suffering from some form of psychic disturbance undoubtedly originating in his failure to mingle successfully with young men and women of his own age. He confessed that a fear of being ridiculed for his lack of teeth made him feel inferior. Any type of denture would be perfectly satisfactory, he said, just so some replacement was available, especially for the anterior portion of his mouth.

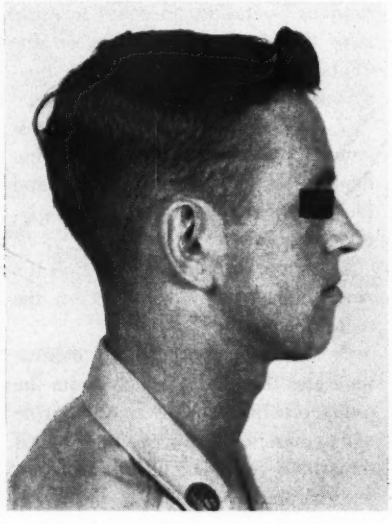
Procedure—At the first sitting the patient's remaining upper teeth were removed and sutures placed. Following a complete healing of the maxillary ridge, an impression was taken and work on full maxillary denture was started. At the same time that this was being done a partial lower denture was constructed.

When the completely waxed-up full maxillary denture was finished it was tried in the patient's mouth. It was apparent at once that a definite prognathic condition existed (Figs. 1 and

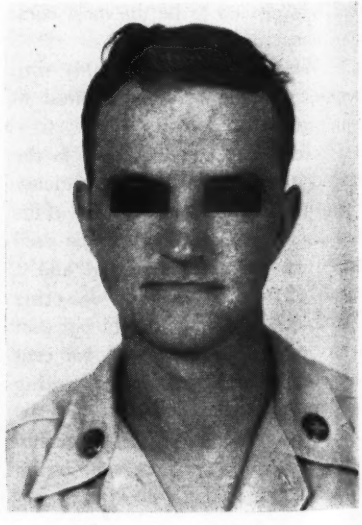
1. *Lateral view without denture in place. This is essentially the same appearance as that with normal arrangement of teeth but without plumpers in place.*

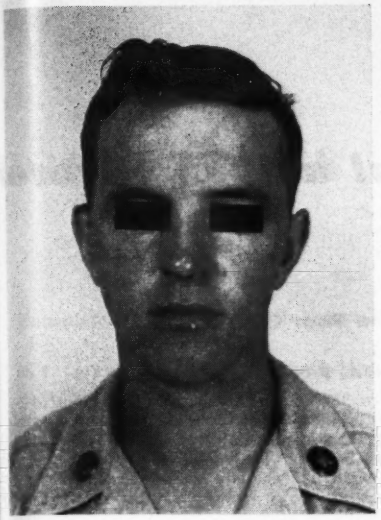


2. *Lateral view with denture in place.*



3. *Front view without denture.*





4. *Front view with denture in place.*

5. *Front view of denture in place.*

3), and that a normal arrangement of the teeth in the denture did not improve the patient's appearance to any measurable degree.

Alterations—It was then decided to move the six anterior teeth a considerable distance forward from the anterior ridge, leaving a large space between the cuspids and the bicuspid teeth. In addition to this measure, plumpers of wax were placed along the entire anterior portion of the denture (Fig. 6). This immediately and noticeably changed the young man's facial contour for the better (Figs. 4 and 5).

The denture was processed, tried in, milled, and the occlusion corrected. The patient was instructed to wear the appliance for several days and then to report back to the clinic.

Results

Upon his return he expressed extreme satisfaction with the dentures and said that several of his intimate friends had failed to recognize him the first day he had worn them.

A follow-up revealed that the young man's social adjustment had undergone a definite change. He was more active, had a different outlook and a more normal attitude toward life.

356 *East 46th Street.*

6. *View of denture to show plumpers in the anterior region.*

Trigeminal Neuralgia

LEO DAVIDOFF, M.D.

AMONG VARIOUS forms of treatment tried, radiation of the region of the gasserian ganglion has been of help in a few cases of trigeminal neuralgia. The effect of this therapy must be carefully evaluated for it has been observed that relief from pain is intermittent.

Good results are seen occasionally with the use of vitamin B or B_1. Nicotinic acid has also been prescribed recently in the belief that it produces vascular dilatation in the region of the gasserian ganglion.

The use of ferrous carbonate is described in a book written in 1822, TRIGEMINAL NEURALGIA, by Doctor Benjamin Hutchinson, an English physician. Doctor Hutchinson found by experiment that 4-gram doses of ferrous carbonate were required twice daily. Many patients later wrote letters telling of their relief from pain for as long as eight years after the application of ferrous carbonate.

Recent employment of this drug has been successful in about 50 per cent of the cases where it has been applied. Although pain is not necessarily eliminated by this medication, it is moderated so that the patient can continue his daily occupations. This can not be said of any other method of treatment, even surgical therapy.

Questions

1. What plan of treatment is recommended in a case of trigeminal neuralgia of only a few weeks' or months' duration?

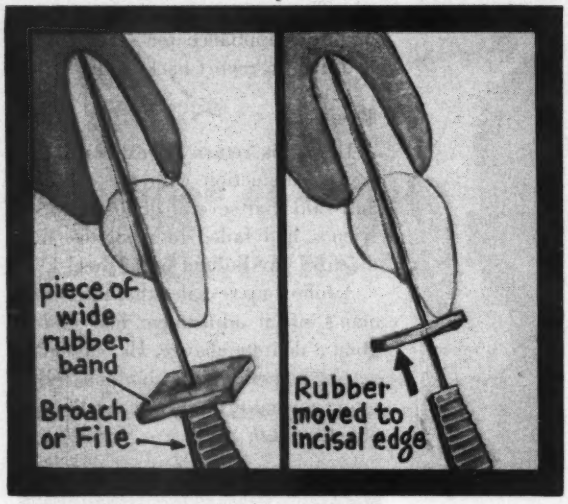
Answer—Immediate surgery would not be advised. Ferrous carbonate in the form of powdered Blaud's mass in capsules of 1 gram each, given in 4-gram doses twice daily with breakfast and with dinner. It is important that it be taken with meals. It may take from 8 to 10 days before relief is obtained. If the pain is so intense as to preclude such a wait, trichlorethylene inhalations may be added. After adequate trial, if relief is still delayed, surgery is advised. For palliation, alcohol injection can be given.

2. Should ferrous carbonate be given for long periods of time?

Answer—Some patients have continued with the preparation for as long as 6 years.

Adapted from Bull. U.S. Army M. Dept. 8:537-541 (July) 1948.

Davidoff, Leo, Chief of neurosurgery, Montefiore Hospital for Chronic Diseases, New York and clinical Professor of neurosurgery, Columbia University.

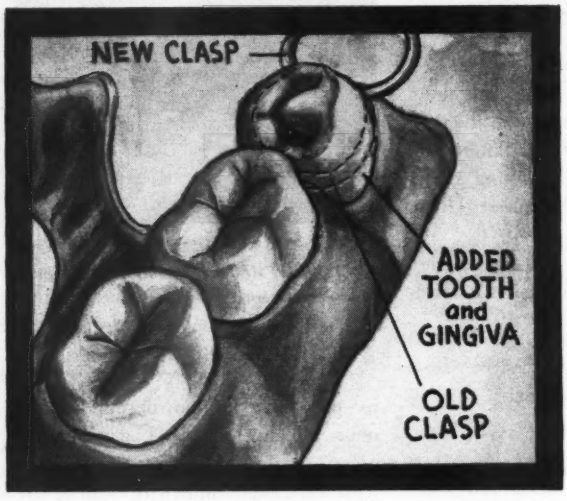


1

Measurement of a Root Canal

Murray J. Roberts, D.D.S., Brooklyn

1. A small piece of rubber band is forced over the point of a root canal broach or file. The instrument is sterilized. When the root canal is clean and the instrument is thought to be at the apical opening an x-ray is made. The rubber is moved to touch the incisal edge of the tooth. This method gives an exact measurement of the root canal.

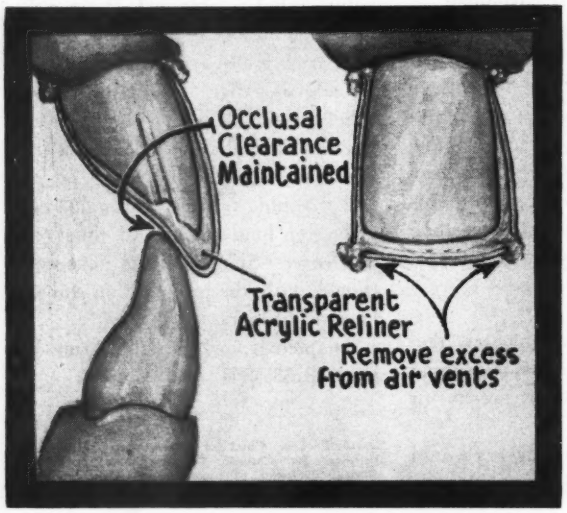


2

Adding a Tooth to a Partial Denture

F. H. Nealon, D.D.S., Lakewood, Ohio

2. When it is necessary to extract a tooth that holds a clasp a new tooth and a new clasp may be added in the following manner: an impression is taken with the partial denture in position. *Do not remove the clasp* but wax the new tooth and the extension from the new clasp into the inside of the old clasp. Process in acrylic.



3

Esthetic Protection for a Three-quarter Preparation

Walter C. Harbart, D.D.S., Los Angeles

3. Coat the preparation with carbolized resin or cavity varnish. Fit a celluloid crown form to the preparation and puncture air vents into the proximal incisal angles. Fill the crown form with a transparent acrylic reliner and have the patient bite it into position. After the form is in proper position the excess acrylic should be removed.

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SUGGESTIONS . . .

Removal of Amalgam Restorations

M. F. Cerkovnik, D.D.S., St. Michael, Minnesota

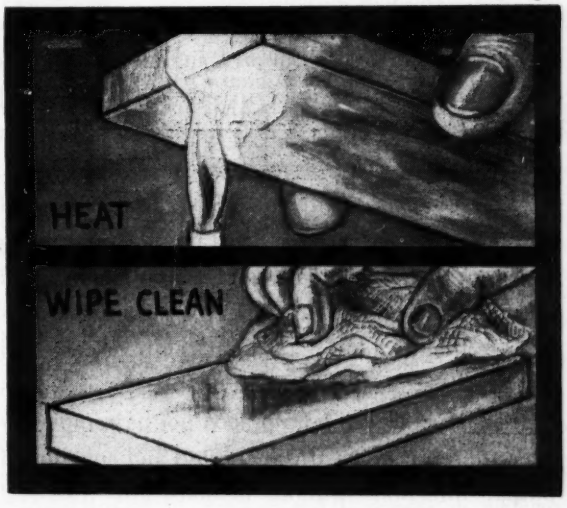
4. A #558 or #560 cross cut fissure bur may be modified by grinding to produce an instrument that has a chisel-like edge for removing amalgam restorations.

4

Resurfacing an Arkansas Stone

Benton Kutler, D.D.S., Omaha

5. To remove the oily sludge from a sharpening stone it is necessary to heat the stone carefully with a Bunsen flame to avoid cracking. When the stone is uniformly heated the oily grit that is driven to the surface is removed with a cloth.

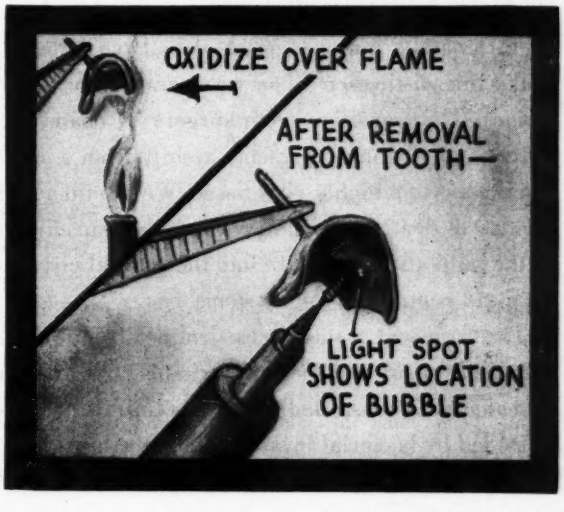


5

An Aid In Seating a Casting

W. G. F. Schmidt, D.D.S., Chicago

6. When a casting fails to seat completely because of a slight obstruction such as an air bubble, the casting may be held over a Bunsen flame long enough for the deposition of a carbon film. When the casting is returned to the tooth the point of interference will show as a light spot. The spot may then be relieved with a small bur.



6

suitable illustrations; write a brief description of the technique involved; and jot down the advantages of the technique. This shouldn't take ten minutes of your time.

Turn to page 522 for a convenient form to use.

Send your ideas to: Clinical and Laboratory Suggestions Editor, DENTAL DIGEST, 708 Church Street, Evanston, Illinois.

The EDITOR'S Page

TOO MANY of us in clinical practice ignore the vital role of the dentine. Although we are aware of the histologic fact that the dentine is in direct anatomic and physiologic communication with the pulp and thus with the vascular system and the central nervous system, we often fail to apply this knowledge in clinical procedures. Many times we operate traumatically upon the dentine and apply caustic chemicals to this tissue as if it were an inert and lifeless substance.

The pulp is the formative organ of the dentine. Throughout life the dentinal tubules and fibrils are pathways to the pulp. Any changes that occur in the dentine or any injury inflicted upon this tissue may be transmitted directly to the pulp and from there into the general circulatory system. It is conceivable, therefore, that disease of the dentine may be a focus of infection from which bacteria and their products are scattered into the circulating blood through the pulpal vessels. After all, root-end disease which has held our preoccupation as a focus of infection is an end result of pulp disease and pulp disease in turn is a result of injury or infection of the dentine. A pulp need not be completely necrotic to be infected. Low grade and subclinical pulpal infections without demonstrable root-end changes may be important foci of infection.

Enamel is basically an inorganic structure; dentine an organic tissue. This is elementary histology. Unfortunately, however, most of us have failed to make this distinction when we operate upon these tissues. The transition from surgery of enamel to surgery of dentine represents a shift from a relatively inert to a highly vital tissue. We should avoid trauma to dentine which may easily be transmitted to the pulp and from there into the general circulatory and central nervous systems.

The forms of traumata to dentine include bacterial, chemical and thermal irritants. It has been repeatedly demonstrated that deep clinical caries is preceded by bacterial invasion along the fibrils and through the tubules. If the carious process is a slow one the pulp may set up a protective response by laying down a barricade of secondary dentine to protect itself from injury. If, however, the caries is acute the pulp has not had the responsive opportunity to create a protective wall of secondary dentine. In these cases the pulp, through the dentinal pathways, is invaded with bacteria and their end products. Whether the pulp becomes infected and subsequently necrotic depends, as it does in the case of all infections, on the dosage and virulence of the invading organisms and on the resistance and responsiveness of the pulpal tissue.

Chemical trauma, aside from the chemical action associated with bacterial activity, is inflicted by the dentist. Caustic drugs and protoplasmic poisons used to desensitize dentine are dangerous agents. Manley[1] has recently warned: "When success has actually been achieved [by dentine desensitization] in spite of the use of tissue irritants it can be attributed to the fact that either the irritant has not penetrated the complete thickness of dentine or to an unusually favorable reaction by the pulp. On the other hand it must be remembered that clinically the first signs of trouble following an injury to the pulp may be those of an apical abscess and that this lesion is the eventual result of an injury sustained some considerable time, possibly years, previously. The fact that the pulp may be fatally injured without producing immediate clinical symptoms constitutes one of our gravest dangers where operations on dentine are concerned."

The thermal trauma to the pulp that follows the generation of heat during cavity preparation is inexcusable. The dentist who uses dull burs or other instruments to produce unnecessary frictional heat in the dentine is completely ignorant of, or indifferent, to the nature of the tissue that he operates upon. Thermal trauma also comes when operations are performed too speedily on anesthetized dentine. The dentine is a vital organic tissue and should be treated as such.

[1]Manley, E. B.: Should Dentine Be Desensitized? Brit. D.J. 85:48-51 (August) 1948.

MEDICINE and the Biologic Sciences

Benadryl—The Common Cold

Encouraging results have been noted recently in the experimental use of benadryl as a therapeutic agent in dealing with the common cold. The findings hold promise and warrant more extensive study.

Benadryl was originally developed as an antihistaminic agent for treatment of allergy, especially the form due to pollens and other air-borne allergens. It was observed that when a patient was treated for allergy with benadryl a cold was completely aborted. Assuming that many so-called colds have an allergic origin or at least an allergic factor, it was decided to use benadryl in a series of these cases.

These experiments demonstrate that benadryl exhibits the following properties useful in the treatment of colds: (1) It inhibits the serous discharge from the respiratory mucous membrane to a degree equal to that of a conservative dose of atropine. (2) In a majority of cases a sedative effect is produced equal to a therapeutic dose of phenobarbital. The sleep induced is usually dreamless and thoroughly refreshing. (3) It is rarely followed by the mental confusion or dizziness upon awakening that is occasionally experienced with the barbiturates or opiates.

In children especially, the cough reflex is inhibited. This is believed to be the result of the elimination of the postnasal discharge. Benadryl aborts herpes, the common fever blister, when taken immediately after appearance of the initial burning wheal.

It appears that the annoying symptoms of the common cold are largely controlled by the use of this drug. There is no evidence of an antipyretic effect. In about 10 per cent of the cases, the serous discharge becomes mucous in character within 24 hours of the onset. Once the cold has fully developed the drug does not prevent the secondary sinus infection. As correct interpretation of the initial symptoms of an incipient cold is difficult to achieve, probably, for full protection, a capsule of benadryl should always be carried.

The adult dose necessary seems to be 50 mg., usually taken in one capsule. For children under 12 years of age, 10 to 25 mg. are necessary. The dose is rarely repeated more than once in 24 hours. No deleterious effects are noted. These are possible, however, with large doses, especially with self-medication and in rare instances of idiosyncrasies. Patients should be warned of its soporific effect and cautioned to avoid driving a car or operating potentially dangerous machinery after taking the drug.

Brewster, John M.: Benadryl as a Therapeutic Agent in the Treatment of the Common Cold, U. S. Nav. M. Bull. 47:810-812 (*September-October*) 1947.

Nutrition in Pregnancy

A number of factors are concerned in the successful outcome of a pregnancy. The important factors are the health and physique of the mother, the diet during pregnancy; age and parity and the standard of medical and nursing care. With a high standard of living the incidence of maternal and fetal complications is low.

Other things being equal, the stillbirth and neonatal mortality rates in the artisan and laboring classes are two to three times as high as in the professional, high commercial and managerial sections of the community. This may be due to the fact that a larger income provides better social conditions, better health, physique and diet.

A good mixed diet of meat, fish, eggs, milk, vegetables and fruits will supply all that is required for pregnancy. When the diet is deficient in quantity or quality or both there will be a high incidence of maternal ill-health during pregnancy. Pre-eclamptic toxemia, more premature labors, more stillbirths and more infants of poor vitality are encountered. These conditions will be more evident in primigravidae over 30 years of age and in twin pregnancies.

A limited food supply during lactation results in competition between the body and the mammary gland for the individual constituents. Available energy must be partitioned between maintenance needs, work and milk production. One or more must suffer in the presence of insufficient intake. The capacity to produce milk is genetically determined but it appears that a restricted diet prevents the inherited capacity from being reached.

The amount of water-soluble vitamins B and C present in mother's milk depends upon current intake for they are stored in limited quantities in the body. Vitamins A and D may be stored in considerable quantities. Therefore the amounts found in milk vary less with day-to-day differences in food.

Approximately 500 cubic centimeters of milk are required daily by the infant at one month. This need increases to one liter at five months when supplementation of the infant's diet may begin.

The moderately active lactating woman requires between 2700 and 3200 calories including 50 grams of protein daily. The importance of a high intake of water must not be overlooked.

It is found that the gain in weight

during pregnancy is related to the appetite but there is no obvious relationship to the quality of the diet. The weight of the baby bears no constant relationship to the weight increase during pregnancy.

It has not been proved that fetal growth in utero is due to the supply of growth hormones or of nutriments, both of which might vary with the mother's size. The physiologic possibilities of controlling birth weight are restricted by the fact that within wide limits the fetus will be nourished at the expense of the mother.

Even if the necessary food were available to all mothers, a great deal of education in food habits is necessary to secure ideal conditions for all.

Baird, Dugald: *Nutrition in Pregnancy, Practitioner*, 160:34-35 (*January*) 1948.

The Deaf Child

In dealing with children it is wise to remember that there are and always will be children born deaf. There will also be children who become severely deaf between birth and the age of 2 years.

The important point to remember is that it is usually the child's failure to develop speech rather than the deafness which is first recognized. These children are unable to learn language and have difficulty in learning speech. At present there are between seventeen thousand and twenty thousand children in our schools for the deaf. Most of the children are admitted at the age of 6, when the nursery problem has passed.

There is little or no provision for handling the little deaf child between the ages of 2 and 6. This is a period when valuable time is lost and when behavior faults and psychologic variations establish themselves. If usable remnants of hearing are neglected, attention deafness fixes itself on the child.

Little can be done to prevent these mishaps. Heredity accounts for only 25 per cent of them and injuries at birth appear to play a minor role. Rubella in the pregnant mother is a frequent cause. Quinine medication at parturition is recognized as a definite cause of deafness at birth.

After birth, the childhood fevers may play a part, not so much in some degree of catarrhal deafness, but in nerve and cochlear damage. Measles is the commonest offender. Meningitis and encephalitis are occasional offenders. Complications from common colds may produce deafness.

Often these children are brought to the doctor around the age of 2 for failure to develop speech. Too often, the child is dismissed for a four year period with the statement that nothing can be done at the time. The child must await admission to a school for the deaf. Children have sometimes been abandoned to a school for feeble minded because deafness was not recognized.

The sooner something is done for these children, the better. Most of them have some remnant of usable hearing. Means of arousing and awakening auditory attention by amplified sound are now available. These tots are usually fretful, restless and ill-tempered on their visits to the medical and dental offices. They balk at discipline and readily go into fits of temper and sulkiness.

This is the initial problem. Until the child is taught to listen and is persuaded to want to listen no progress in teaching language can be made. In the normal child language is the outcome of two years of listening, during which word images and word meanings have been built up. Only when these have been developed will a child attempt to imitate what he hears in speech.

It is surprising to find that many of these children have as much as 50 to 60 per cent hearing in the speech hearing zone. It is possible, therefore, that a 40 to 50 per cent loss can cause the child to become attention deaf. Most adults with this amount of loss do well with a hearing aid. The difference in the situation is that the adult with acquired deafness has already learned language and speech. The deaf child never heard well enough to make it worth while for him to listen. Consequently, no word images and no word memories were built up in his mind.

The dentist in his office and in preschool examinations is in a position to deal with children professionally early in their lives. He can render a valuable service by recognition of the disability and recommendation of early treatment. An effort should be made to prepare these children to enter schools for children with normal hearing. A normal environment is the greatest need of any handicapped child.

MacFarlan, Douglas: *Problems of the Congenitally Deaf Child, J. A. M. A.* 137:774-775 (*June* 26) 1948.

Metopon Hydrochloride—Present Status

In the spring of 1947 a plan of supervision was set up for the use of metopon hydrochloride in the control of pain in cancer. The Committee on Drug Addiction and Narcotics of the National Research Council recently summarized the results of the plan.

The essential difference between metopon and morphine is the presence of a methyl group attached to the hydroaromatic ring of morphine. Metopon also differs from morphine by the presence of a ketone in place of the alcoholic hydroxyl and by removal of one double bond by hydrogenation.

These chemical changes result in an increase in analgesic action, and a decrease in euphoric, sedative, emetic and intestinal effects. Tolerance to and dependence on metopon develop more slowly; tolerance disappears more rapidly than with morphine.

Metopon does not fully satisfy the craving or completely suppress abstinence phenomena in cases of morphine addiction. The minimal analgesic dose, the incidence of adequate relief, or side actions and the duration of action are the same for oral and hypodermic doses.

The first few months of experience with metopon have confirmed the earlier results of controlled clinical tests

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and trials. It is a satisfactory analgesic for severe chronic pain when administered orally. Such administration is attended by a high degree of mental clarity and few side reactions. Its usefulness is improved if administration is begun as soon as the need for a potent analgesic arises, before the administration of morphine and similar agents render the drug ineffective.

The Committee recommends that metopon be made available only for oral administration for chronic pain. As a result the drug may now be obtained through regular channels in the same way as morphine and related substances. It is subject to narcotic regulations.

It is important to hold narcotic administration to a minimum. To facilitate this and to permit the adjustment of the dosage to the needs of the particular case each capsule contains 3 mg. of metopon hydrochloride. The minimal effective analgesic dose in non-tolerant persons is 6 mg. Therefore, the dose is two capsules for persons who have not previously taken morphine and related narcotics. For persons already tolerant to morphine and the like, three or more capsules may be needed.

Article: *Metopon Hydrochloride*, *American Professional Pharmacist* 14:619-621 (*July*) 1948.

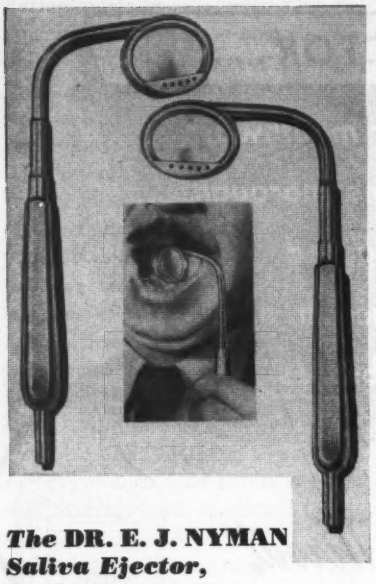
Color Blindness—Corrective Treatment

In the United States there are about 6,000,000 men partly or completely color blind. Many of these men are engaged in transportation, the arts and crafts of interior decorating, printing, painting, textiles and color reproduction. If it were possible to remedy or mitigate the deficiencies in these persons the benefit would be incalculable.

During World War II, the business of controlling color blindness or coaching men to pass tests assumed considerable proportions. Many methods were used. Repeated observation of bright colors, the making of color judgments and distinguishing between red and green lights were common. Subcutaneous injections of iodine were used, electrical stimulation of the eyeball, or heat over one eye. Other victims were subjected to looking at dazzling colored lights.

Therapeutically, extremely large doses of vitamins, chiefly various preparations of vitamin A with stress on emulsification and injection of cobra venom, were employed. Repeated coaching on pseudo-isochromatic plates or other color blindness tests and constant wearing of glasses tinted with the color of the presumed deficiency were advocated in some cases.

According to the National Bureau of Standards, U. S. Department of Commerce, a person with anomalous vision receiving training of various kinds becomes progressively familiar with the particular chart used to gauge his progress. Repeated efforts to read the charts afford opportunity



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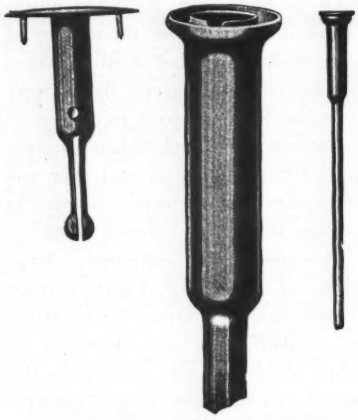

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for practice and cut down the time required.

About 8 per cent of healthy men have red-green deficiency to some degree. Red-green confusers may be the cause of serious accidents and mishaps due to faulty interpretation of signals or landmarks.

The Inter-Society Color Council Subcommittee in its report to the American Medical Association stated that, "the reliable scientific evidence indicates that the majority of persons with deviation from normal color vision possesses some congenital retinal or neural defect which neither diet, nor drugs nor training in perceptual discrimination can remedy."

In the interests of society and of the individual, caution must be exercised to detect these conditions and recognize that little can be done to better them. In June, 1947 The Association of Schools and Colleges of Optometry passed a resolution condemning so-called "corrective training of color vision defects."

Based on the conclusions drawn from experimental evidence on the subject, the consensus among the best informed specialists in the field is that congenital color deficiency cannot be remedied by the use of diet, medicine, training or any other treatment known to science.

Farnsworth, E. B.: Investigation on Corrective Training of Color Blindness, Sight-Saving Review 17:194-195 (*June*) 1947.

Influenza Vaccines— Present Status

In the accelerated program sponsored by the Preventive Medicine Service of the Office of the Surgeon General and other agencies, the prevention of influenza was placed high on the list. Improved means of studying viruses of all varieties were utilized and the two strains A and B were soon developed sufficiently to make a vaccine.

During the winter of 1943 an evaluation of the effect of vaccination against influenza A was made. The study was carried out in Army Spe-

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cialized Training Units in different universities throughout the United States. The results of these first tests show that the incidence of influenza in the vaccinated group was 2.2 per cent and in the control group 7.1 per cent. It is presumed that a more complete protection was not secured because the first vaccines were not purified as well as later preparations.

Better results were obtained against an epidemic of influenza B in an Army program of general vaccination at the University of Michigan in 1945. Here, the incidence in the unvaccinated group was 9.9 per cent and in the vaccinated group 1.1 per cent.

On the basis of present knowledge, influenza vaccine appears to have an effect of rather specific nature against infection by influenza A and influenza B. There is no evidence that the vaccine influences the incidence of common colds and other unidentified respiratory infections. The effect of the vaccine, as now constituted, against all the possible strains is not known. The Committee on Influenza thinks that there is no satisfactory evidence of protection against such an epidemic as that of 1918.

In some individuals virus vaccine causes reactions similar to mild reactions from typhoid vaccines. Usually less than 1 per cent have fever of no more than 24 hours' duration. Aches and discomforts can be controlled by the use of mild analgesics.

Evidence points to the fact that this form of reaction is related to the amount of virus in the vaccine rather than to extraneous egg materials. The number of reactions with purified material increases as the virus content of the inoculum increases. A suggested dosage scale is: (1) for children under 5 years of age 0.1 to 0.3 ml.; (2) from 5 to 10 years 0.5 ml.; (3) above 10 years 1.0 ml., the full dose.

General employment of influenza vaccine by health departments as an administrative policy is not recommended at the present time. In certain groups, however, the prevention of influenza even in a mild form is desirable. These are: (1) older persons among whom fatality is high and others to whom infection presents undue risk; (2) industrial groups and essential public service personnel in whom even a temporary incapacity creates a serious problem; (3) institutional and university groups.

Later reports from several sources indicate that influenza vaccine is not as effective as early studies suggested it might prove to be. It appears that the ambition to develop a vaccine to prevent influenza has not actually been achieved. The variability of the strains seems to be the obstacle which must be overcome. The same questions concerning the viruses suspected of causing influenza and those pertinent to the viruses of poliomyelitis must first be answered before satisfactory progress can be expected.

Editorial, Internat. M. Digest 52:247-248 (*April*) 1948.

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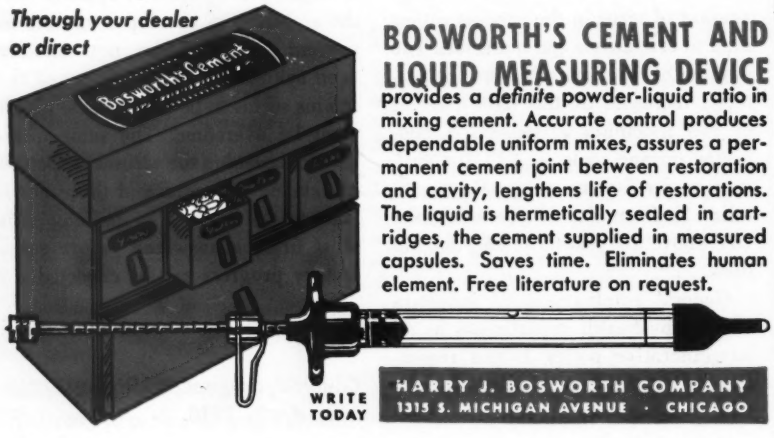

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Life at a Dental Seminar

Any dentist who has the opportunity to attend a Seminar should be quick to seize it. Living and eating and visiting together for four days with one's colleagues is a refreshing experience. The idea of the intensive Seminar should be credited to Hermann Becks of the University of California. Doctor Becks' serious interest in dental medicine led him to organize Seminars on this subject. The dentists of California, Oregon and Washington have profited beyond measure by their attendance at these Seminars which have been held in some of the finest resorts on the west coast—Palm Springs, Carmel, Yosemite.

The enthusiasm for similar Seminars on dental medicine is spreading throughout the United States. In every region alert dentists are clamoring for these intensive courses. One of the recent Seminars was held for four days in mid-September at the comfortable Maxwelton Braes Country Club at Baileys Harbor, Wisconsin. The Midwest Seminar of Dental Medicine was organized under the genius of Isaac Schour of the University of Illinois, College of Dentistry. It was attended by fifty-two dentists from midwest states. This number was the capacity of the club. Hundreds of other dentists would have accepted invitations to attend if facilities had been available.

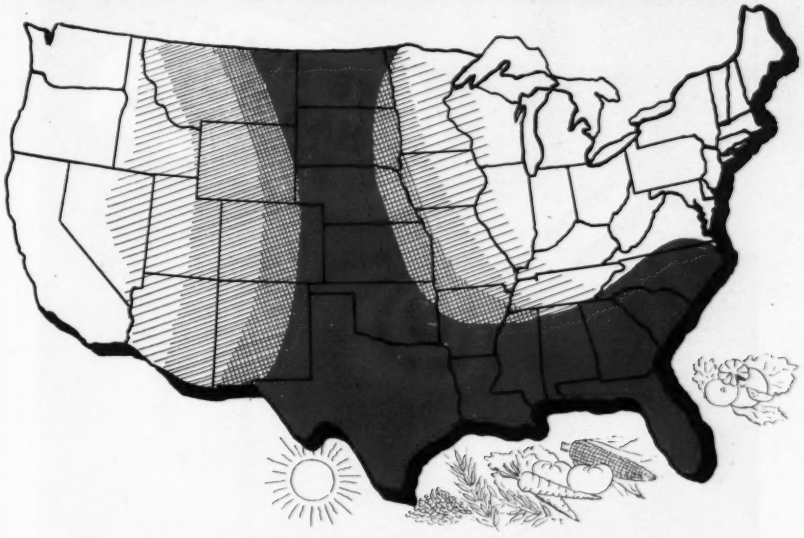
Why this sudden interest in dental medicine? Why are dentists who have been concerned for years with technical procedures beginning to take such a serious interest in biologic subjects? It appears that we are beginning to see that dental diseases are no different from other diseases in their mechanism, in causation, and in

their expressions. Circulation, nerve conduction, inflammation, bacterial phenomena follow the same patterns in dental tissues as in other tissues. In our thinking we have finally begun to connect the teeth with the rest of the body.

The Father of Dental Medicine, Hermann Becks, has expressed the philosophy admirably: "Dental Medicine, however, is not a specialized form of dental practice; it is as broad as the field of science itself. It seeks to bring to the practice of dentistry the application of basic principles of human biology, fundamentals of medicine, and specialized knowledge of the diseases of oral structures. It is, in brief, an attitude toward practice rather than a specialized regimen. It encourages and requires the consideration of each patient as a complex human individual rather than as a simple problem in oral pathology. Dental Medicine teaches that this attitude must permeate every step in the management of the patient: establishment of the etiology and pathology, and determination of the diagnosis, therapy, and prognosis. Only thus can there be brought to each patient the type of attention which the state of scientific knowledge leads him to expect and to which he is entitled."

The Midwest Seminar of Dental Medicine was a concentrated four-day course in recent advances of physiology. The teachers were among the quality of the scientific world: Knisely on Circulation, Menkin on Inflammation, Gersh on Histochemistry, Becks on Clinical Applications. No man among us that didn't feel humble in his ignorance of the complexities of modern science. In the pleasant surroundings of a country club the Seminarians were exposed to a scientific jargon unfamiliar to many of us and to biologic subjects of vast importance. Most of us were "over our heads." This is a good experience. It is fine discipline to have one's ignorance exposed. There was no talking down to the dental Seminarians. The scientist-teachers made few compromises in their presentations. They talked as if they expected us to know; it was our responsibility

In your ORAL HYGIENE this month



Regional Dental Health Conditions

Is dental health related to physical environment? . . . Doctor Herbert H. Schmitt has written a report of his findings after examining workers at Portland shipbuilding plants. Men and women from all parts of the country, from all income groups, and of all ages, were represented in this cross-section study. He discusses caries of local origin and caries of systemic origin. You will not want to miss this interesting article.

★ ★ ★

Do you like your friends as patients? . . . How do you treat them, and how do they treat you? Doctor Stanley C. Brown discusses this rather touchy subject in an article which should help dentists "derive pleasure from our services by making all patients friends and all friends patients"—and still receive a fair fee.

★ ★ ★

Diabetes sometimes causes dental conditions which the unthinking practitioner might dismiss as purely local in origin. Lester Hollander, M.D., medical director of Pittsburgh Skin and Cancer Foundation, discusses the oral manifestations of diabetes in the hope that its earliest appreciable symptoms may be recognized by the dentist.

"Don't 'Lend-Lease' Your Name," cautions Harold J. Ashe . . . Endorsing projects and causes without thoroughly investigating their worth and management is dangerous practice.

★ ★ ★

Dentists are meeting "buyers' resistance," says Doctor M. R. Stern, as he explains that "inflation is not prosperity. Rather it is a threat to prosperity," and suggests that dentists take intelligent stock of their ability to meet changing conditions.

★ ★ ★

"Raise Your Son To Be a Dentist," advises Doctor Arthur H. Levine in the latest article of this interesting series. Dentists have been discussing the pro's and con's of dentistry as a career for their sons . . . and even dentists without sons find the argument interesting.

★ ★ ★

In addition to these six articles, all of the regular departments wait for your spare-moment reading. Short, varied, and interesting, they present the humor, philosophy, technical data, news and views that complete the pattern of dental life. There's even a technical quiz to test your memory and knowledge.

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STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS, OF AUGUST 24, 1912.

Of Dental Digest, published monthly at Pittsburgh, Pa., for October 1, 1948.

State of Pennsylvania,
County of Allegheny,
ss.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared M. B. Massol, who, having been duly sworn according to law, deposes and says that he is the Publisher of the Dental Digest, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in Section 411, Postal Laws and Regulations, printed on the reverse side of this form, to wit:

1. That the names and addresses of the publisher and editor, are: Editor, E. J. Ryan, B.S., D.D.S., 708 Church Street, Evanston, Ill.; Publisher, M. B. Massol, 1005 Liberty Ave., Pittsburgh, Pa.; Managing Editor: None; Publication Manager, R. C. Ketterer, 1005 Liberty Ave., Pittsburgh, Pa.

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(Signed) M. B. MASSOL,
Publisher

Sworn to and subscribed before me this 17th day of September, 1948.

(Seal) John C. Crouch, Notary Public.
(My commission expires April 12, 1951.)

to be alert to the subject matter.

Life at a dental Seminar begins at seven A.M. with a friendly knock on the bedroom door. Breakfast is at eight with the Seminarians wearing whatever clothes they wish to insure their comfort. At nine the sessions begin and run in three periods until noon. No smoking allowed!

The afternoon is free until four o'clock. Among the Seminarians at Maxwelton Braes many chose the time wisely for a nap. At four the teachers and the students met over tea and coffee to visit informally on the subjects studied. It was significant that most of the Seminarians deserted the golf course, the horse's back, or their comfortable beds to attend these informal sessions.

Dinner was served at six-thirty and the evening sessions ran from eight to ten. Every student had a detailed manual of lecture outlines that had been sent to him in advance of the meeting. Nearly everyone took careful notes although a sound recording machine was used to record every word spoken.

A Seminar is quite different from an ordinary dental meeting or a convention. The subject matter is concentrated; the sessions begin and end promptly; there is no smoking in the lecture hall. There is but little nipping on the bottle at any time. There is no formal entertainment. Everybody suits his own fancy, does as he pleases, dresses as he wishes. The cordiality is something! If there were any interpersonal tensions among the group I did not discover them and, thanks be given, there were no politics or politicians.

I am a little hazy on my Latin but I imagine that the word Seminar is derived from the word seed. It is a good word and has many implications. Seeds of broad wisdom are dropped. Some do not at once germinate and spring to life in the form of practical application. Many seeds lie dormant—the seeds of big ideas. Some day they begin to sprout and grow in our minds and from that awakening ideas are born that may benefit all mankind. No one will deny that this kind of planting will have a worthwhile harvest.

Public Speaking Made Easy

Everybody who talks in public is looking for a formula to make himself as effective as Winston Churchill. A large number of promoters have made themselves wealthy by publishing self-help manuals and by sponsoring courses in public speaking. I've known a few people who have bought the books or taken the courses and as far as I could see they didn't become good enough to make Demosthenes swallow his pebbles from envy.

Some of these boys learned how to fix a silly leer on their faces that was supposed to be the heaven-sent smile of an effective personality. Some of them, in fact, learned the gymnastics of flailing and waving their arms with outright abandon. But still they could not make a good speech.

I am not acquainted with Lionel Crocker of Denison University but I am impressed with his simple hints to public speakers. Let's call it *A Trinity of Hints*—the three Be's, the three In's, and the three Up's:

1. THE THREE BE'S: BE BRIEF, BE BRIGHT, BE GONE.

2. THE THREE IN'S: INTERESTING, INSTRUCTIVE, INSPIRING.

3. THE THREE UP'S: STAND UP, SPEAK UP, SHUT UP.

With the heavy siege of fall and winter speaking near at hand, I hope that our dental society speakers will memorize Mr. Crocker's suggestions. I am particularly hopeful that the mumbling and bumbling speaker who holds his chin on his sternum and presents the crown of his head to his audience will take the advice. What dental society will have the courage to nail the Three Be's, the Three In's, and the Three Up's on the speakers' rostrum?

—E. J. R.

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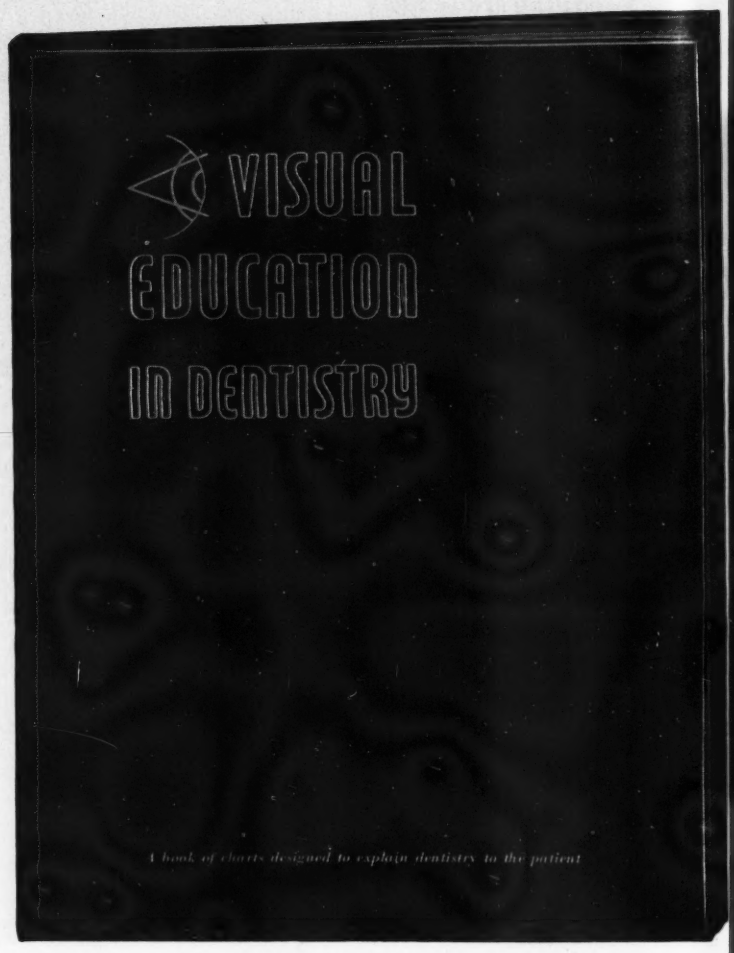
29. The Requirements of a Correct Restoration
30. Development of the Skull



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CLINICAL AND LABORATORY SUGGESTIONS

(*See pages* 508 *and* 509)

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Subject: _____

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Sketch:

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Early Symptoms of Neurologic Disease

(*Continued from page* 502)

loss of the corneal reflex, which will enable foreign matter to cause damage to the cornea. Facial paresthesias commonly develop, with deep, boring pains, and subjective symptoms of burning and crawling, in the affected side.

Summary

The earliest manifestations of certain neurologic diseases may occur in structures observed by the dentist. Although the diseases themselves are not common and, therefore, more likely to be overlooked, the dentist will, nevertheless, wish to keep them in mind because of their seriousness and the possible value of early recognition.

Adapted from *Oral Surgery, Oral Medicine, and Oral Pathology* 1:480-484 (May) 1948.

Impregnation For Caries Prophylaxis

(*Continued from page* 505)

when zinc chloride-potassium ferro cyanide is used for the first impregnation and for the second, 10 per cent silver nitrate solution precipitated with a saturated solution of calcium chloride. Double impregnation achieves the best desensitization. It is advisable to use the same procedure in impregnation for caries prophylaxis. Some organic materials may combine better with zinc chloride and others with silver nitrate. To avoid the risk of discoloration in the front teeth the second impregnation should be done with zinc chloride.

When to Impregnate

1. As soon as they erupt the occlusal surfaces of the first molars should be impregnated.

2. Between the ages of six and twelve three double impregnations a year are necessary. After that, continuous tooth eruption slows down and one impregnation a year of the entire clinical crown should be adequate. For the cementum surface use three impregnations a year since it is difficult to penetrate the cementum.

3. Impregnate after cleaning and check the root surfaces for sensitivity to cold.

4. When dentine is exposed a number of dentinal tubuli are opened. They should be impregnated immediately after preparation; and the impregnation repeated until cold water is not felt.

5. In subgingival cavities impregnate with 10 per cent silver nitrate solution and precipitate it instantly with 1 per cent hydrochloric adrenalin (RBoelsche).

6. The patient should be advised to remove partial dentures during the night to give the saliva a chance to wash the clasped teeth. Impregnate all teeth at least three times before setting the appliance.

Impregnation of Dentine

The term *carious dentine* is misleading. There is a difference between *necrotic and decalcified dentine*. Decalcified dentine has lost its calcium

sales, but is otherwise histologically intact. There is no reason for removing it, thereby running the risk of exposing the pulp. Impregnate until cold water is not felt. Then make a temporary cement filling. This filling should not be removed for three months. When it is removed after several months the dentine is usually found to be hard and the preparation and filling can be finished in comfort.

By this procedure many cases of pulp exposure can be prevented.

—From *The Journal of the Canadian Dental Association* 13:530-531 (November) 1947.

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You probably were included; thank you, and thank you again. If not, join in. Add even a tiny remembrance to the bottom of this year's Christmas list. Send your contribution to your Tuberculosis Association today, please.

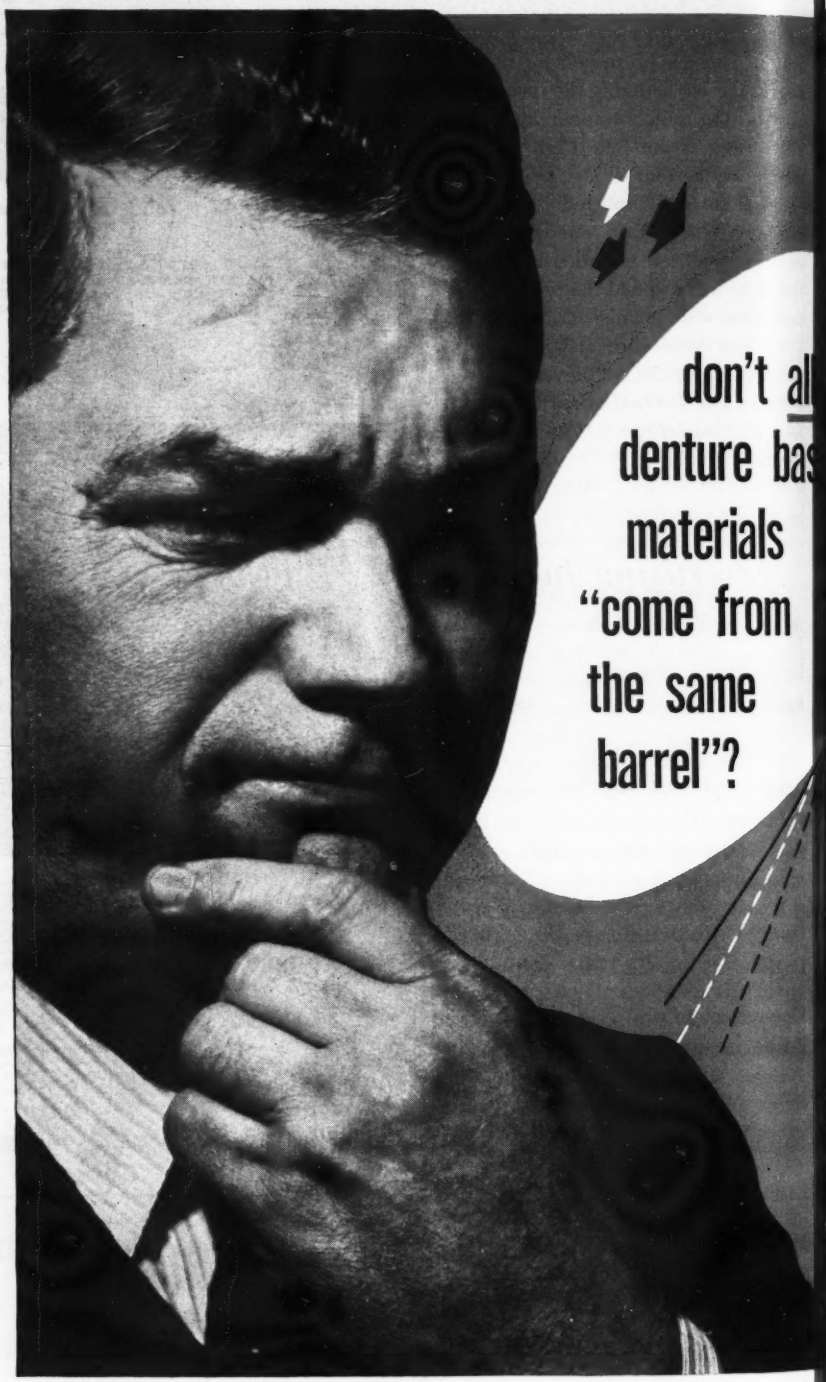
(Advertisement)

Do you read dental advertising?

On the face of it, that seems to be a foolish question. Of course you do —everybody does, at least to some extent. A more significant question might be — how carefully and how regularly do you read it and how much of it do you believe?

Modern day dental advertising is, for the most part, informative, truthful and factual. However, except for a few products certified and policed by the American Dental Association and the censorship of the publishers themselves over untruth or misrepresentation, advertisements can appear in the dental press that make claims of superiority in generalities only and unsupported by scientific proof. The ethical manufacturer, however, exercises his own strict censorship of advertising, knowing all too well that the slightest deviation from the truth can deal his product a black eye from which it might well never recover.

Therefore, it is well to study all dental advertising with the question in mind as to whether or not claims advanced are substantiated. It is not always possible to do this within the limits of the printed page but at least statements to the effect that proof is available should be sought. Also, certain products fall into the realm of personal opinion, such as the color of a denture base acrylic or the form of an artificial tooth. Claims along these lines can never be proved and indeed, require no proof. They are self-evident to the observer.



Demand proofs of superiority . . .

Take for example, the much debated physical properties of the many denture base resins. A considerable number of these are grouped in the "accepted" list and therefore, must and do fulfill all requirements on which acceptance is based. But, assuming a product is developed that represents an advance over these minimums in one or even several directions, how is the dentist going to find out about it? First of all, of course, through advertising announcements, which are designed to arouse his interest and create a desire for trial. Naturally he wants to avail himself of all new scientific improvements, the better to serve his patients. Having read about such improved products, is he going to believe what he reads—enough so that he wants to try the product out? He will if proof is offered.

It is interesting to note that recently a new denture base (already accepted) has appeared that *does* claim superiority in physical properties and which *does* offer proofs of these im-